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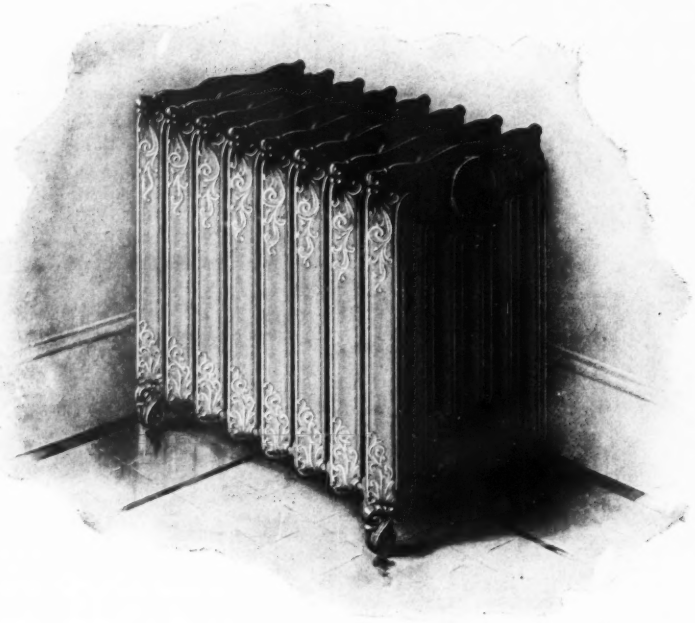

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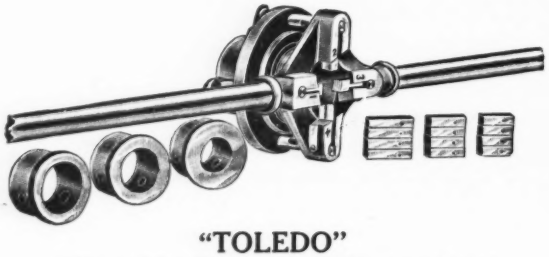

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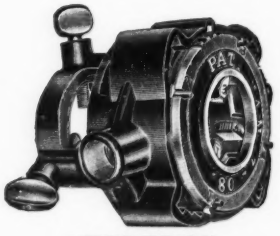

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Published Every Saturday by

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MAIN OFFICES.

323-325 Dearborn Street, Chicago, Ill.

NEW YORK OFFICE - - - - 150 Nassau Street

SUBSCRIPTION RATES:

United States, Cuba and Mexico.....$1.00 a year
Canada .....$2.00 a year
Other Foreign Countries.....$3.00 a year
12 shillings. 12 marks. 15 francs.
Single copies of current issue, 5 cents; copies of back numbers, 10 cents each.

Remittances.—Subscriptions are payable in advance, and remittances should be made by check, Chicago draft, postal or express money order, in favor of DOMESTIC ENGINEERING.

Change of Address.—The old address should be given as well as the new, and notice should be received a week in advance of the desired change.

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Entered as Second-Class Matter at the Post Office at Chicago, Illinois, Under Act of Congress of March 3, 1879.

Member of the Chicago Trade Press Association.

Member of the Federation of the Trade Press Associations of the United States.

Whole No. 893. Vol. L. No. 4. Chicago, Jan. 22, 1910.

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THE BENEFITS OF A COLD WINTER.

The severely cold weather which has afflicted the United States for several weeks will have one result, at least, which will please the steam and hot-water fitter. By the strenuous work which steam and water-heating plants have had forced on them many old equipments will be quite worn out, requiring replacement with new material before another winter; many plants which have capacity enough for weather which only occasionally drops to zero and then comes back to between 20 and 30 deg. above zero, by this long continued zero weather, have had their weak spots developed, and before another winter many inadequate boilers and insufficient radiators will be replaced. All this work will be welcomed by the fitter, and, during the pleasantness of a long, warm summer he should not forget to go out and dig up this class of work. If he refreshes the memories of his clients by recalling this cold winter, he can secure a great quantity of profitable work in an off season.

The severe winter should have another effect, at least in certain territories. Some people, secure in the belief that "seasons are changing" have been rather scant in their provisions of radiator and boiler capacities. This good old-fashioned winter should serve as a check to this tendency and teach owners and architects that extended periods of low temperature still have to be expected and provided for. The growing temptation to put in boilers and radiators which are too small should be cured by this winter's experience. It is the belief of all experienced heating men that a house-heating boiler which is large enough to do its work without forcing is more economical in the consumption of fuel than one too small. It is now advocated by many boilermakers that the greatest number of heat units are extracted from coal when burned with considerable draft, the claim being that many combustible gases escape up the chimney unburned unless there is sufficient draft passing through the fire-box to carry the temperature of the combustion-chamber to a point high enough to ignite these gases. This is an added reason why the large fire-boxes which are found in larger boilers will be found more satisfactory. In these boilers there is enough room in the combustion-chambers to allow free giving off of these gases, their unison with oxygen, and consequently ignition by the fire burning at a high temperature.

If the increased fuel expense consequent upon a severe and extended winter shall call the attention of consumers to the great necessity of learning how to operate a house-heating boiler correctly, much economy will have been gained. The waste of fuel in this good country is criminal. Mr. Edison names two problems as being absolutely necessary to be

overcome before industrialism will be supreme. The first is "fuel waste" and the second is "friction." There is no doubt that fuel is wastefully burned by the consumer, and this can be overcome in part by carefully educating people in right methods of firing boilers.

But a greater portion of the blame for fuel waste must be attributed to the manufacturers of fuel-consuming devices. They have not yet provided appliances which get more than a fraction of the heat units from the fuel consumed. That road leads to the greatest possible improvement, and the progressive steam and hot-water fitter should encourage with orders any manufacturer who comes along with house-heating boilers which seem to promise improvements in the combustion of fuel.

These are some of the good influences of an "old-fashioned winter." Jno. K. Allen.

WAIT A MINUTE!

In reading the editorial in defense of anti-siphon traps in a recent issue of "Domestic Engineering" I was very forcibly reminded of an incident that happened in a court some years ago. The "persecuting" attorney was quoting at length from several authorities and closing the last book he had taken up, was about to proceed with his argument when he was interrupted by the trial judge, who said: "Wait a minute, Mr. C——! Just read the rest of that last authority's remarks!" Which, when done, brought out a different meaning entirely. So we should be very careful in approaching disputed or open questions and—wait a minute—to see if there might not be something more to the question.

Especially in regard to questions regarding plumbing installation should we be careful about quoting authorities,—because there are no authorities.

The report of the Sanitary Committee of the National Association of Master Plumbers can be considered an authority only in so far as the experiments and observations conducted under their supervision went; and that was only in examining the sewer air for the presence of bacteria. Even the entire absence of bacteria does not prove that sewer air is harmless or that no precautions need be taken to exclude it from the habitation of mankind. The editorial referred to quotes this report as follows: "I believe, however, that my results, in the light of all previous evidence, warrant the conclusion that the chance of direct bacterial infection through the air of drains and sewers is so slight as to be practically negligible" (see page 85). On page 20 of the same report we find the following: "The possibility that small amounts of drain air may exert such a predisposing action upon the system as to render it susceptible to typhoid fever still remains open, as suggested by the experiments of Allessi, and this phase of the subject well deserves further experimental study."

So according to the very authority quoted in that editorial, air in house drains and sewers is not merely a bad smell which esthetic reasons demand shall be kept from inhabited rooms.

Wait a minute! for I wish to testify right now to an authentic occurrence. Some years ago I was called in on an obstructed sewer. Upon opening the house drain at the curb we found that roots from a tree had found entrance and, growing in the pipe, had obstructed the entire capacity of it. It was necessary to break the pipe and the 3 ft. long mass of roofs was brought to the shop for my inspection. My step-father, who happened to be visiting me at the time, examined it as a curiosity, and upon returning to his home was taken violently ill. The physician (who knew absolutely nothing of the sewer incident) pronounced it a case of poisoning of a typhoid character. The patient recovered and unbeknown to the doctor we again subjected him to the influence of the sewage-soaked mass of roots and the symptoms reappeared. This seemed to me pretty fair evidence that the sewer air in that particular house drain at that particular time was poison to that particular man. But, wait a minute! A certain young lady suffered from periodically returning sore throat. The physician in the case inclined to think that there was some extraneous reason for the persistent return of the malady. Our firm was called in and put a smoke test (under pressure) on the plumbing work, with the result that they found the house sewer defective and an open vent end. These defects were remedied, the job made tight, and although the same young lady lived in the same house until her marriage some years later the malignant sore throat did not reappear. (Name, street number and physician's address can be had on application.)

But, wait a minute! Some years ago we had a stopped house-drain. The laborer sent to dig up the pipe in the yard got drunk on the job and left it lie. The owner came to me good and mad, so was yours truly. I personally went to the job, jumped in, finished what little digging there was to be done, and cleaned out the stoppage. I went home, ate my supper and not feeling well went to bed. In one hour from that time I was delirious. Our family-physician pronounced it sewer-air poisoning contracted from exposure to the sewage-soaked ground while in a state of temporary exhaustion caused by that, to me, unusual exertion of digging.

I therefore believe from the foregoing, in the light of my experience, that the results warrant the conclusion that sewer air, so far as infection detrimental to health is concerned, is not practically nor theoretically negligible.

I fully agree with the editor that simplification of plumbing must come, but would respectfully call his attention to the fact that the report of the Sanitary Committee of the National Association of Master Plumbers is but a small fragment of the work that must first be accomplished before we or any one else can really and honestly say: "We know what is right to do." And in the meantime I would respectfully and emphatically protest against the injustice of putting the work and conclusions of this committee in a false light by quoting part of its report as facts and amplifying therefrom something they did not say and do not mean. Let us wait many minutes and read all they say and all we can ascertain before we constitute ourselves an authority on the right and wrong of plumbing installation. I again return to what I pleaded four years ago: What we all need is a central body composed of the scientist who knows nothing necessarily about plumbing, the practical plumber, as represented in his associations, and the inspector, for the purpose of gathering data and making necessary experiments, tabulating and comparing results, to the end that we may arrive at some positive knowledge which we all now sorely lack.

Newark, N. J. H. F. Baillet.

The Public Works Committee, Pittsburgh, Pa., has approved of the ordinance providing for the purchase of 12,000 water meters for $145,000.

Heat: Its Use and Distribution*

(Continued from Page 60, January 15, 1910.)

Steam may be styled a low potential and electricity a high potential heat distributor, the low potential being best suited for short distances and the high potential for long distances. Low potential distribution by steam fulfills so few needs that we are compelled to transform it into high potential heat equivalent—electricity. The loss between the heat value of the coal and its final equivalent in electricity averages about 90 per cent. This wasting of our natural resources is only condoned by our ignorance; we have not been able to do any better. A comparison with water-power efficiency shows how much better we have mastered mechanical properties of primal heat transference.

Other forms of sub-agents for heat distribution are in extended use and gas may be considered the chief form from a standpoint of direct heating value. A pound of coal of 14,000 B. t. u. heat value transformed into gas would give an average of 5 cu. ft. of gas of a total thermal value of 3,000 B. t. u.,—not much better than 20 per cent efficiency. The by-product coke, tar and other ingredients of coal all have a heat value which makes the apparent result less wasteful. Gas admits of much more extended distribution than steam, and in many instances, particularly with natural gas, is transported hundred of miles economically. In view of the variable heat values of the residue left from a pound of coal converted into gas it is very hard to consider gas alone as a sub-agent of heat distribution by assigning it a definite efficiency of transformation. This phase of the problem had best be taken up under a later head wherein the commercial efficiencies of the various sub-agents will be determined.

Natural gas and crude oil are among nature's primal heat storage agents and form a group secondary in importance only to the three principal agents considered. Natural gas is almost universally applied directly as a heating agent and is transformed through gas engines into a mechanical equivalent for the performance of useful work. These gas engines may in turn drive electric generators. The efficiency of transformation of natural gas into electricity is much less than water power into electricity. The thermodynamic efficiency of a gas engine may be as great as 25 per cent and the electric generator 97 per cent, making a combined efficiency of 24 per cent, as against 70 per cent obtained from a water power. and where conversion to electricity must be performed for distribution it should never be burned under a boiler where the final result in the form of electricity would average not better than 10 per cent of the original thermal value of the gas. The same argument applies to crude oil, and it should be considered a criminal waste of natural resources to burn oil or gas under a boiler for further transference into mechanical or electrical power.

Having briefly outlined the relation of the various primal heat storage elements and their use, it is in order to tabulate them so as to fix them in their permanent relation.

Water-power conversion to electrical or mechanical equivalent 70 per cent efficiency.

Coal, wood, gas or oil under boiler to hot water or steam equivalent 60 per cent efficiency.

Coal, wood, gas or oil under boiler for mechanical or electrical equivalent 10 per cent efficiency.

Coal or oil into producer gas 20 per cent efficiency plus coke, tar, etc., as by-products,

Natural gas, manufactured gas, crude oil, converted in gas or oil engine 25 per cent efficiency of the fuel value.

The same converted into electricity, 24 per cent efficiency.

From the above it is seen that of all the primal heat storage agents, water power at present furnishes the one we can use most efficiently. This use, however, may entail a greater cost of development and utilization than some cheaper transformation from other elements. This would probably be the case in the presence of a large pocket of natural gas or oil which for a brief period would furnish heat at a minimum cost. But all such sources of heat are exhaustible; our supply of coal, oil and gas is so well defined that it is merely a matter of calculation as to the number of years they will last at the ever-increasing yearly rate of consumption. The great continuous sources of energy that are constantly renewing themselves are the water powers and the forests. As long as the sun shines on the earth the cycle of evaporation, condensation and precipitation will take place and produce our rivers from which we derive our water powers. The forests act as the equalizers or governors of the run-off, so that we have a somewhat average flow throughout the year. The excess forestation or growth may be utilized for lumber, fuel, and the thousand and one purposes to which it is put. If these forests are destroyed the greatest agent we have for the use of primal heat is taken away, and it would only remain to exhaust the already depleted coal, gas and oil fields to destroy our present industries and civilization. This feature is dwelt upon because it becomes imperative for us to solve the problem of the most economical use of our primal storage agents in order to conserve them as long as possible. This brings us to the general deduction that all forms of direct or indirect heat application should be carried out by the agents or sub-agents offering the most economical use of the original primal agent. We must capitalize the primal heat agency, giving the B. t. u. a primal value from which all derived values must be taken. Thus a water power may be expressed in equivalent B. t. u. value, a pound of coal, a gallon of oil, or a cubic foot of natural gas or a cord of wood. That a basic cost per B. t. u. is proper may be proved by reducing the interest charge on the cost of development of a primal agent to its equivalent B. t. u. value. In other words, all energy, whether represented by human labor, stone dams or turbine engines, has an equivalent B. t. u. value. Thus we say that the cost of delivering a horse-power of electrical energy per year from a given water power is $10. This $10 represents fixed charges, depreciation, operating expense and a reasonable profit on the investment without any value being placed on the water itself outside of the cost of the original water rights. Reducing a horse-power year to its equivalent B. t. u. value, we find that the cost is 0.000045 cents per B. t. u., or 4½ mills per 10 kilo-B. t. u. of derived energy. This represents the basic B. t. u. cost of this particular water power in the form of electrical energy. The additional costs of transmission and transformation are not included in the above.

Coal at the mine may be compared to a water power.

*Read before the Association of Engineering Societies, May 10, 1909, by Lyman C. Reed, Member Louisiana Engineering Society and reproduced by courtesy of the Journal of that Association.

The cost of coal delivery at the mine mouth should include the cost of mining, interest on the investment, sinking fund and a reasonable profit. Assuming this value at a dollar per ton, and an equivalent B. t. u. value of 14,000 units per pound of coal, a value of 3.6 mills per 100 kilo-B. t. u. is found to be the basic value in direct heat units. As has been pointed out, this heat value transformed through steam into electrical energy would give a cost of 3.6 mills per 10 kilo-B. t. u. without any addition for fixed charges on plant equipment, which formed the greater portion of the cost in the water-power estimate. Assuming the cost of $75 per h. p. for plant equipment, and calculating interest and depreciation at 10 per cent, operating costs at $3.50 per year, we should have a charge of 4.5 mills per 10 kilo-B. t. u., making the total cost per 10 kilo-B. t. u., 8.1 mills. This proves that under the most favorable conditions coal cannot be burned under a boiler, transformed into electricity and made to compete with water power at $10 per h. p. per year. The same coal used in a producer gas generator and the gas utilized in a combustion engine will give far greater economy in the use of fuel, but owing to the greater cost of the plant the final economy is not very much better.

With coal at $3.00 per ton the comparison is greatly in favor of the producer gas plant, as the fixed charges and operating remain the same, the values being 15.3 mills for steam and 11.4 mills for producer gas per 10 kilo-B. t. u. As a rule, all gas engine plants are more expensive than the equivalent steam plant, varying from one and a half times the cost of the steam plant. If the same interest and depreciation are charged on both equipments and the operating cost worked out, it is an easy matter to determine from the fuel cost which type of plant is best for a local condition.

If direct low-potential heating is required it can be generated, including the boiler cost, at less than one mill per 10 kilo-B. t. u., which is practically 22 per cent of the cost of high potential heat distributed from a $10 per year h. p. water power. Many low-head water powers that will cost huge amounts of money to develop will remain in their present state as long as the cost of other forms of stored energy can be applied more cheaply. The cost of coal, oil, natural gas is certain to increase as the quantities become more limited, especially if the problem of storing and using the direct heat of the sun remains unsolved for commercial application. In time this will force the development of every possible water power, and the intrinsic value of the water power will be further modified by the character of the market to which it must look for support.

The comparison between coal and water power in the foregoing was based on the cost of coal at the mine, but if coal be figured at $3 or $4 per ton, as it must be for some sections of our country, the comparison becomes still more unfavorable. Equalizing factors may exist in the market being a great distance from the water power, in which event the interest and depreciation on a transmission line would possibly offset the greater cost of coal. Determinations such as these must be made for each local condition. The easiest way to solve the problem for any locality is to ascertain the intrinsic value of a kilo-B. t. u. of the nearest water power and compare this with a like value for coal, natural gas or oil at the nearest point of delivery, adding to each value the cost of delivery per kilo-B. t. u. at its market. Assuming a cost of ¼ cent per ton mile for transporting coal and a haul of 400 miles, we find that it would cost $8.650 to deliver one ton per hour each day of the year. This is equivalent to an average of 1,000 e. h. p. per hour if generated in a steam plant. The transmission of a 1,000 h. p. 400 miles, assuming the cost of the line to be $4,000 per mile, and interest and depreciation at 10 per cent, and line loss at 10 per cent, would be $161,000 per year, showing that it is much cheaper to transmit the raw material than its equivalent in electrical energy. The above will apply to gas and crude oil in even greater degree. If, instead of transmitting 1,000 h. p. per hour electrically, we transmitted 20,000 h. p., the cost for interest and depreciation on the line would remain practically the same, but the cost per 1,000 h. p. would be $8,050 as against $161,000; 10,000 h. p. would cost $16,100 per 1,000 h. p. This shows that a balancing ratio exists between the cost of transmitting raw material and generated power, and where large quantities of power are used many cities or industrial plants could save money by removing their plants to the coal mine if water power was not available. The continuity of service is sometimes of greater value than a lower cost of production, and until long high voltage transmission systems are rendered more reliable, the steam plant will exist in localities where its economic existence should end.

In the foregoing determinations values are predicated on plants delivering large quantities of power at an average rate. A plant's load factor is very essential in determining cost, and the higher the load factor the cheaper an electrical unit can be produced. Any central distributing heat system must, therefore, try to maintain as high an average load as possible in order to keep the cost per unit of fixed charges down. It becomes incumbent on such a system to supply a community or city with a selected heat supply system so that every demand is studied and the most economical service devised to fill the need. After the basic cost per B. t. u. for any community has been determined by an exhaustive study of local conditions, the cost of furnishing each B. t. u. need of the community is the problem to be solved.

Finis.

PRICES IN THE IRON TRADE FIRMER.

There is from day to day regular buying—mainly of the retail kind, with now and then a really large lot. But while the majority of the transactions are small, yet there are enough of them to make a handsome tonnage, in the aggregate, according to Matthew Addy & Co's. weekly letter. The buying is distributed through all kinds of iron, showing that every line is busy. There is no doubt that consumption is steadily increasing. The general foundries were slower in getting started than the steel and malleable works, but they are now going full tilt. Some of the foundries are busy for months ahead and have been obliged to decline quick orders from inability to take care of them. It does not matter where you go, the iron trade has its hands full. Since the first of the year prices are noticeably firmer. There seems to be no reason to fear that there will not be demand for all the iron that can be produced, even granting that production will exceed all records. In the South there is a difference of feeling as regards price—some iron-masters holding at $14.00 for No. 2 and some at $14.50. In the North the price is generally $17.00, with a premium for the last half. There is much trouble in moving iron promptly, as the weather has tied up the railroads more or less. The coke situation is really almost desperate, as so many coke operators have been put out of business by the severity of the weather. It looks as if there could be no betterment in railroad conditions for some time to come.

Some Heating Questions—IV.

A Jug-Handled Heating Deal

By Charles B. Starkey.

That is the kind of a heating deal it really was and he was madder than a wet hen as he rushed into my shop one day fairly sputtering with rage and asked if I would come up to his house and look over a heating job. I did not tumble to the racket right then, or I would never have left the shop, so I put on my coat and hat and walked with my prospective customer to his house, which was located several blocks distant from my place of business. We walked around the residence to the back door and went down cellar and then I got a surprise, for instead of a job "hooked up" and ready for business, everything was in the utmost confusion. The boiler was set up, it is true, and the main was slung in and a start had been made on the branches and risers of this jug-handled steam job and right at this point the work seemed to hang fire as something appeared to have gone wrong.

"Say," said my prospective customer, "if you can tell me why this job should work out in this manner, I'd like to know."

To say that I was surprised would be putting it in a mild fashion. I was thunderstruck, for here was a mar well off in worldly goods, trying to save a few dollars by putting in his own steam job, which he had purchased of some concern advertising jobs that any person could install.

So I took the time to look matters over a bit and observe how the thing worked out and I found that it was about as nice a mix-up as one could desire. Of course, being inexperienced, the man had bored about half of the holes in the floor anywhere from one to four inches out of place and in the three radiators he had attempted to couple up he had made the risers come to place so that where they went to the second story they were entirely out of plumb.

One of the risers was about an inch too long and the radiator stood on two legs with the valve end entirely clear from the floor. The point on which he stuck was the next branch which he had to install. It was made to its place all right, but fell about seven inches short of coming under the hole where the riser must go and this cheap man was stuck.

Now, even a shop boy would have known enough to have used a coupling and a nipple long enough to splice out, but our friend was mad and rattled and plainly did not stop to think, nor did he apparently care. So after looking this ready-made jug-handled heating plant over to my satisfaction I turned to the owner and said: "Been investing in old junk, John? Where did you get this outfit, anyhow?"

"Why, I got it up to the city and it was recommended to be all right."

"Paid for it yet?" I questioned. "Yes," said he.

"Well, I don't see how I can help you any," I answered, "although I might leave you a suggestion. Suppose you write to the concern which sold you this outfit and get a real steam-fitter, if they have one. He might, perhaps, be able to cobble up the job. Good day, I have business elsewhere."

And with that I left him to his own devices. Now, some persons will probably say that I did wrong and should have jumped right in and straightened out matters. Who would have paid for my time? Who pays for the many hours that many a master fitter spends in figuring out bum work, anyway? Why should a fitter or plumber spend time to think and give an expert opinion and receive merely a "thank you," for his trouble and sometimes not even that? Why should not a plumber or fitter receive pay for expert advice, just the same as any other expert? One goes to a lawyer or a doctor and pays anywhere from $5.00 to $100, and sometimes more, for advice upon questions pertaining to his health or business. Why should the master-fitter or master-plumber give valuable advice free?

He has spent years in study and the practice of his business in order to acquire this information and can anyone tell me a good reason why he should peddle out this wisdom free of charge? If so, I should like to be informed.

I digressed a bit. Let us now resume the story. I have heard the argument put up that the master should do all the work that came to his shop, thus acting as a peacemaker and spineless being in general. Such a course, followed out completely, would bring the shop, at last, to a point where mere "jobbing" would be about the only thing open to it. There is no money in mere work for the average shop. The profit must be made upon the goods, in case any profit at all is obtained. Why should the master-fitter or master-plumber be the one picked out to make the sacrifice and put a good business in a position where it would be liable to fade away entirely?

"To get what business we can," answers some nerveless party. It is mighty sure that such a party lacks spunk. Say, I'd sooner sell popcorn at a corner-stand and run my own business.

The trouble is that a party who would take such crumbs as that does not possess nerve enough to get out and see what he really could do in his town or city in the line of making sales. He may be a first-class workman, but, in 9 cases out of 10 he is certainly no salesman, or he would be out and nail his part of the business in sight.

One of the most convincing arguments I ever saw (for it was in plain sight and open for observation) was this: The master of the heating shop had some boilers of one of these concerns which he had pulled out and they were placed on his premises where all could see. The circumstances were explained and he said, "Now I'll figure your job and if you want one of these boilers you can have it at your own price. We will omit that item from the list and you can pay me whatever you think the boiler is worth. Meanwhile, here is this one, which burned some 30 tons of coal, while the one I put in its place is consuming about 18 on the same job. Which boiler in the bunch will you take?" Do you "reckon" you could

*Previous installments of this series appeared in our issues of Dec. 4, 1909; Dec. 18, 1909, and Jan. 8, 1910. Back numbers may be obtained for ten cents per copy.

give him one of those boilers which had been thrown out?

The argument comes up as to whether or not a man has the right to do heating and plumbing work for himself upon his own premises. I mention this because some one is liable to advance it in the course of conversation.

Certainly he has the right to do his own work, provided he has a certificate, and only then, and I believe that the day will soon come when this will come into effect.

I certainly would not install a job for a party who was small enough to send out of town to buy his goods simply because he could get them for a few dollars less. If I had a chance to get at him before he purchased I would try to show him where he was getting "stung" and would offer him the same line of goods for the same price, or perhaps a few dollars less. It can be done as anybody will see who will take the trouble to figure the matter out. Nevertheless, I should try and get the party to purchase a better class of goods and it ought not to be a hard matter to prove to him the whys and wherefores of this argument.

If, after all this argument, he bought his goods by mail and wanted repairs, or the job fixed up, he might get the repairing done where he bought the goods.

I am well aware of the fact that there are various parties who will object to this advice, but I believe that while a man does business under a sign which advertises "Steam and Hot-Water Heating," he should make it a point to run that proposition as a business, to do the work properly, to sell the goods, and to look up the people who need jobs and, if possible, sell them the outfit complete. Should any one then be green or greedy enough to buy an outfit and pay for it before the job is installed let any party to such a jug-handled deal suffer whatever consequences may arise when they find out how nicely they have been "stung."

TRADE-GETTING SALESMANSHIP.

By A. C. Cogswell, Detroit, Mich.

The problem of getting near to trade, that is the problem of breaking down the barrier of reserve by which buyers surround themselves, involves important factors in salesmanship. When you hit the nail once on the head you give it a start into the board, the second hit drives it just a little farther, the third keeps it going, driving it in deeper, and it depends on the length of the nail, the fibre of the board, and the man behind the hammer how many whacks will have to be given before the nail is driven home. It is a cinch that your nail must be sharp or your board pretty soft, or you must be a pretty heavy hitter to drive the nail home with one whack. On the same plan the salesman has to keep pounding away on the goods represented to the buyer and even then it does no real good unless skill is used and good judgment, and the salesman leaves the buyer with a good taste in his mouth and in such shape that he will extend to you the "glad hand" when you call again.

Reaching a man's desk every three or four weeks, as a salesman, it must appeal to you as only a question of time before a buyer falls. This may be brought about either from interest, curiosity, your own personality or because he feels that, if you are enterprising enough to spend your money to reach him, you have stamped yourself and your company as progressive enough for him to deal with.

If you are going to reach a buyer don't go all the way there and lose your tongue when face to face with him. Talk of the right sort helps. Circumstances, however, do alter cases. For instance, if you are selling a line that in general appearance resembles your competitors', who are disposing of their goods at a smaller price than you do, then it is good business to show your samples and let them talk for themselves. Quality counts under all circumstances. The article itself will often tell more quickly its merits than much talk. Illustrations can never convey to the buyer the full worth of an article. On the other hand, if the goods are well known and things are equal it will depend much on the manner in which you present your case whether you make a sale or win approbation with promises for future business. Try and win your buyer so that he will always give you a preference.

The head of one of the largest establishments in the plumbing supply line once said to the writer: "Preferences in business mean 33⅓ per cent to the good for business coming your way." This is undeniably a fact, and it is something that the writer has never forgotten. Furthermore, under such circumstances, as a preference given, you will never have to beat a price to make a sale, although you may have to meet a price. It does not pay to bore the buyer. Remember, you are only one of a hundred or more concerns that are making constant claims upon his attention. He sees all kinds, listens to their story, sizes them up accordingly, good, bad and indifferent. He has to pass up many and he knows his man, for as a rule he is as able to judge human nature as the man who calls upon him, and in many cases, yes, very many cases, better able to judge their merits.

Above all things work when you are away from headquarters. Put your whole time and attention on your work in order to make good, and if you sell an order for a thousand dollars the first half day out, remember there is the last half day before you. Try and sell another order equally as good, or better, if possible, the same day. Your time is not your own; it belongs emphatically to your employer. He pays the expenses and you draw your salary, that goes with it.

Here's to the man who does his work as well while away as he does it when at home! Sell your customer the first bill of goods, make him stick to you. Show constant, honest, keen, practical, personal interest in him.

In conclusion, allow me to quote the words of the Adcrafter: "Give me charity and good cheer and a minute or so for the beginner and plodder while practicing at all times the noble art of minding my own business. Give me strength to be a booster, a kicker never, and may I always play the game like a gentleman. And in the end, may God protect me from the belief that I am superior in knowledge or performance to my brothers and find me a place in the sacred city of ideals."

PLUMBER TEMPTED BY MILLION.

A young plumber in Edwardsville, Ill., recently got into trouble by stealing a pocketbook containing $100 from an inventor. This is good news. We did not know any inventor ever had $100. It shows that the inventing industry is coming to its own at last. There is some excuse for the plumber, for the inventor's name was Thomas Million and there are a very few of us who could keep company with a "Million" for a whole evening without succumbing to temptation. The plumber was caught by his lavish leakage of his ill-gotten gains, wherein he showed the usual human frailty. Plumb foolish, was it not?

Modern Conveniences for the Farm Home*

By Elmira T. Wilson, C. E.

Formerly Assistant Professor of Civil Engineering, Iowa State College.

Continued from page 74, January 15, 1910.

COLLECTING THE LIQUID WASTES.

As has been pointed out in the previous paragraphs, intermittent application is the key to success, and in order to apply the liquid waste or sewage to the land intermittently it is necessary to collect the irregular flow from the house in some manner.

The House Drain or Sewer.

The house drain of cast-iron pipe extends at least 5 feet outside of the foundation wall. From this point to the collecting chamber vitrified sewer pipe is used, except in made ground or in quicksand or where the drain must pass near a well, when cast-iron pipe should be provided. The drain should be given a uniform fall, if possible, and should be at least 3 feet below the surface in cold climates, to avoid freezing. The greater the inclination the less the liability of obstruction. A fall of 1 ft. in 40 or 1 ft. in 60 ft. is desirable; 1 ft. in 100 ft. is the least that should be used unless special flush tanks are provided. The bottom of the trench should be dug to the exact grade and shaped to fit the lower half of the pipe, with grooves cut for the sockets. Inspection and cleaning hand-holes should be located about every 50 ft., and their exact location marked on the plan of the drain, to aid in locating obstructions, if any should occur. Change of direction of the pipe line should be made with special curved pipes of large radius.

Making the Joints.

The joints of the pipe should be well made. The space between spigot and hub should be filled first with a small rope of picked oakum, rammed into place with a hand iron to prevent any cement mortar from entering at the joints. Then fill the remainder of the space with a mortar made of one part portland cement and one part clean sand. The cement and sand must be thoroughly mixed dry and wetted up only as needed. The bottom of the joint should be made with particular care, using the fingers to press the mortar into place. As soon as the joint is finished the groove in the trench should be filled with earth to prevent the joint being broken before the cement has time to harden. The inside of the pipe must be thoroughly cleaned from projections of oakum or cement. If the drain passes close to trees the joints should be surrounded by concrete to protect the pipes from the roots of the trees. Before refilling the trench the joints should be tested by closing the main outlet and filling the pipes with water. Leaky joints are undesirable, both because of the contamination of the soil and because the liquid is needed to carry the solid matter through the pipes.

Volume of Sewage.

The volume of the sewage is practically equal to the water consumption. The waste matter received increases the volume very little, 1 lb. in 120 gals. is organic matter, to remove and destroy, which is the purpose of the "disposal plant." The garbage or kitchen refuse, of course, is not included. This 1 lb. of organic matter with its 120 gals. of water is all carried by the house sewer to a suitable place, the distance from the house varying with the surrounding conditions, and collected in a chamber to which has been given various names, according to the manner of use proposed. We have the "flush tank," the "settling chamber," and the "septic tank," and these may be so constructed and used that it is difficult to draw an exact line between them.

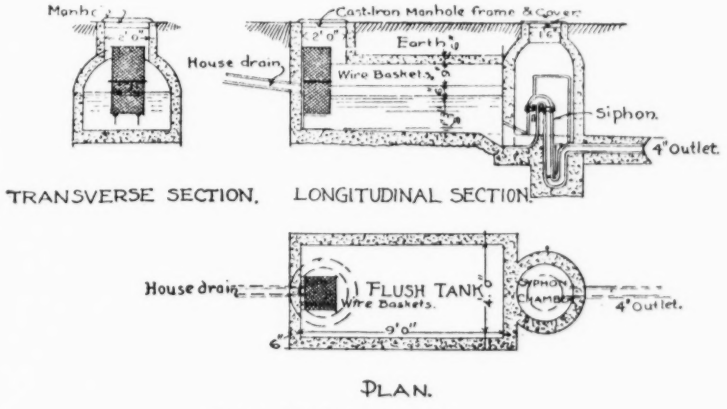


Fig. 9. Simple Flush Tank.

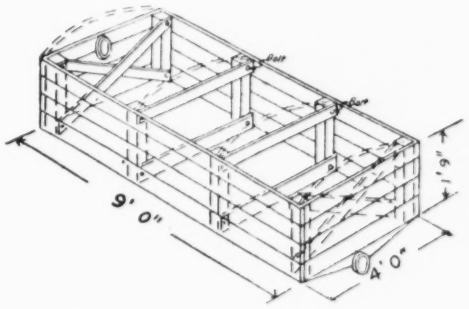


Fig. 10. Form for Concrete Flush Tank.

FLUSH TANKS.

A flush tank may be built of brick or of concrete, and is designed simply to collect the irregular house flow in order that it may be applied to the land at intervals varying from 12 to 24 hours. The size of such a tank depends upon the number of persons in the family using the water supply, which again varies with the habits of the family. The report of the data collected upon the use of water in the city of Columbus, O., where 80 per cent of the houses are metered, states that the amount of water used per capita per day varies from 60 to 100 gals.

A Simple Flush Tank.

The simple flush tank shown in Fig. 9 is designed for a family of six, using 60 gallons of water each per day. If the flush tank is to empty in twenty-four hours, the

*Prepared and published by direction of the Department of Agriculture, Washington, D. C.

tank must be designed so the siphon will empty it when 360 gal. of liquid matter are collected. Counting 231 cu. in. to the gallon, the capacity of the tank must be about 48 cu. ft. The depth at which the liquid will stand in the tank will be determined by the action of the siphon. The automatic siphon shown with this design will hold the sewage to a depth of 1 ft. 3 in. Whenever the tank fills to the discharging line the liquid is set in motion through the siphon, and when the tank is empty the siphon "breaks," and no further discharge takes place till the tank is full again. The depth of the sewage being fixed by the siphon selected, in this example at 1 ft. 3 in., the area of the tank must be 38 sq. ft. to hold the estimated flow. A width of 4 ft. and a length of 9 ft. gives about the required capacity.

Construction.

This tank is built of concrete in the proportions of 1 part of portland cement, 2 parts of clean sand, and 4 parts broken stone or gravel. If the sand contains both fine and coarse grains so much the better. The broken stone or gravel should vary in size from ¼ in. to 2 in. in longest dimensions, and the more variation within these limits the better.

Care should be taken to make the excavation just equal to the exterior measurements of the tank, in order to save material. Slope the bottom toward the outlet and cover it with 4 in. of concrete for the floor of the tank. Set the outlet while the floor is being laid. Build the interior form as shown in the sketch (Fig. 10), using wood screws in construction, as pounding to remove might injure the concrete. This framing is set on the floor when the cement has hardened. Inch boards are used to complete the form, and are put in place as the wall is carried up. The concrete is put in in layers from 8 to 12 in. deep, and is thoroughly rammed with a 4-in. or 6-in. rammer, which weighs about 20 lb. The inlet pipe must be set at its proper elevation. When the top of the uprights is reached segments of circles are supported on them, as shown by dotted lines in the sketch. These have a rise of about 9 in. and should be fastened to the uprights in such a way that they can be readily removed, and so that they will not interfere with the bearing of the top on the side walls. The boards placed on these must be narrower, say 6 in., and the concrete must be mixed somewhat wet, as little tamping can be done, only enough to exclude the air. This arch should be at least 5 in. thick. The manhole can be built by using sheet-iron forms, made so they can be expanded or contracted in removing them. A 4-in. space between these should be sufficient. The manhole walls are carried up to the surface of the ground. After a few days the forms are removed and the interior is plastered with a mortar of one part cement to two parts clean sand. If the boards have been given a coating of soft soap they will be the more easily removed from the concrete walls. If at any time in building up the walls fresh concrete is to be deposited upon that which is already set, the surface of the old work should be cleaned and wet and coated with a mortar made of one part cement and one part clean sand. This precaution should also be taken at the joining of the sides to the bottom of the tank. For a water-tight tank it is better to lay the walls without such joints. Where the side walls are to join the bottom of the tank the concrete should be roughened after being rammed for the floor, and a 1 to 1 mortar spread over this roughened surface when beginning to build the side walls.

The cost of the materials for the concrete in this tank will vary in different localities. If portland cement is bought at 44 cents a bag, sand at $1.50 a cu. yd., and broken stone at $4 a cu. yd., an approximate estimate of the cost of the material would be $23.

Use of Screens.

When a simple flush tank like this is used, paper and such coarse material should be screened out at the inlet. This is accomplished by having two baskets (16x16x16 in.) made of diamond-mesh wire cloth woven of No. 12 wire, one to the inch, with an opening near the top at one side to receive the inlet pipe. Hooks are provided on the side walls to hold the basket in place, and as the sewage passes through the paper any solid matter is retained. The second basket is used as an alternate when cleaning is necessary, which should be done once a week. A very small residue will be found in the basket, and this should be removed and spaded into the ground. The basket retains all material that would be unsightly if scattered over the surface of the ground or might obstruct the draintile in the case of subsurface disposal. A single-chambered flush tank is not advisable in most cases for subsurface irrigation. The draintile would need to be taken up and cleaned out more often than when a settling chamber is used.

Open Tanks.

These tanks may be built of brick and plastered inside with cement mortar. If desired, they can be built near the surface of the ground and left open. In this case wire-cloth screens built in sections should be furnished to protect the contents against leaves and rubbish. If an open tank is desired, it would be well to build it not more than 2 or 3 ft. wide and get the cubic contents necessary to contain the daily flow by increasing the length, as the narrow tank is desirable to prevent the screens from sagging. If the walls are occasionally swept down after the tank has discharged no odor should be noticed in the neighborhood, and its location near the house could be objected to only for esthetic reasons. A tank which is open will be more likely to freeze over on the surface. To prevent this frames covered with boards might take the place of the screens in winter. The danger from freezing is not great, as the sewage is warm when it comes from the house.

Double-Chambered Tanks.

For subsurface disposal it is necessary in most cases to provide a double-chambered tank, the first chamber to retain the solid matter and scum until they dissolve, and the second chamber to accumulate the liquid wastes and discharge them intermittently by means of a siphon.

Description.

One type of the double-chambered tank is shown in Fig. 11. This tank was designed to take the place of two overloaded cesspools, which were creating disagreeable odors. The amount of sewage to be disposed of daily was estimated from the amount of water used by the family of five, the water supply being distributed through the house from a 580-gal. tank in the attic, which is filled about every other day by means of a hot-air pump. The flush tank was designed to take care of 350 gal., or 70 gal. per capita per day. The pipe connecting the settling chamber with the flush tank is arranged to draw the liquid from midway between the surface and bottom of the settling chamber, so as not to disturb the solids that have settled to the bottom of the tank or the scum that floats on top. All sewage coming from the house passes into the settling chamber, where the solid matter to a greater or less extent is deposited. Owing to the character of the sewage, the decomposition of the solids is so active as to prevent any serious accumulation in the bottom of the settling chamber. It is necessary to inspect the chamber from time to time, and if undissolved solids accumulate to have them removed, probably about once a year. This accumulation when removed should be carried to the field and spaded into the soil at once.

Construction and Cost.

This tank was built of concrete in a manner very similar to that previously described for the single-chambered tank. The manholes were built of brick, and the siphon placed directly under one of them for convenient access to it. The cost of the material for this tank, including the siphon and cast-iron manhole covers, was $51.61. The lumber for the forms costs $9.85.

Fig. 12 shows an inexpensive collecting chamber designed by Prof. Anson Marston, of the Iowa State College. The septic tank is arched over with brick and only the two manhole covers appear on the surface of the ground. The screen of fine pebbles and of sand retains all solid matter in the septic chamber, and on account of the upward action of the sewage the screen does not become clogged. The siphon chamber will vary in size, depending upon whether a sand filter or subsurface irrigation is used for the second step in the purification of the sewage. With a sand filter the siphon chamber could be emptied in 8 hours; with a subsurface irrigation, in 18 to 24 hours.

SUBSURFACE IRRIGATION.

It has already been explained that only the upper layer of the earth contains air enough to allow of the bacterial action necessary for sewage purification, and also that nature has her limits and must not be overworked; hence, there must be an intermittent application of the sewage or the process of purification will cease altogether. Although the sanitary results would be accomplished by surface irrigation, the character of the soil may allow and the requirements of the family demand the distribution to be beneath the surface.

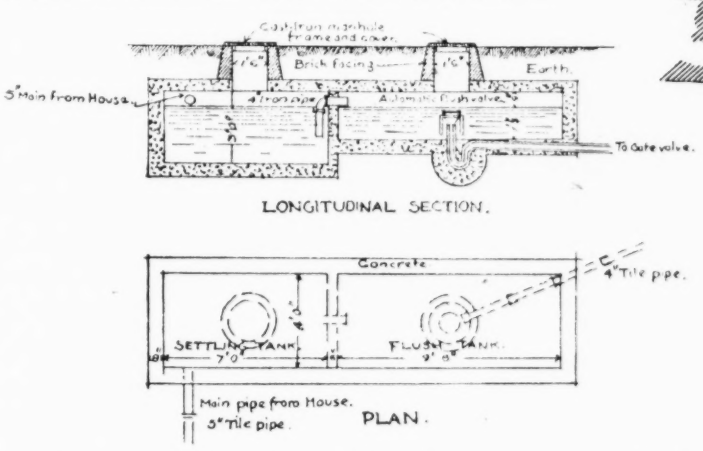


Fig. 11. Double-Chambered Flush Tank of Concrete.

Use of Draintile.

To secure subsurface disposal 3-in. agricultural draintile are laid with open joints, the bottom of the tile coming within 8 to 12 in. of the surface of the ground. These drains should be laid nearly level or with a very slight fall, say 2 in. in 100 ft. If too steep the lower part of the field will be flooded. The ground should be naturally or artificially so well drained that water will descend through it readily, and porous enough to admit the air. If the subsoil is not porous enough to remove all the water settling through the upper layers it should be underdrained by lines of 4-in. tile spaced from 25 to 40 ft. apart. If a suitable outlet can be had these underdrains will do better work if placed 5 ft. below the surface, although 4 ft. will answer. The outlet should run perfectly free.

Adaptations to Different Soils.

The most suitable soil is a sandy loam, while clay and peat are the most unsuitable; although heavy clays can be used, where nothing else is available, by good underdraining and by filling the distributing trenches, after laying the tile, with sand, gravel, or fine cinders. The drainage will improve with time and the soil be able to purify an increased amount of sewage. The length of tile required for distributing the sewage will depend upon the porosity of the soil. For a porous soil 1 ft. of tile for each gallon of sewage should dispose of the liquid. If the soil is heavier the length must be increased. For clay there should be at least 3 ft. of tile per gallon.

Different Methods Illustrated.

Figs. 13, 14 and 15 show different methods of laying out these drains, depending upon the slope of the ground. In Fig. 13 the double-chambered tank is located in the side lawn about 70 ft. from the house. A 4-in. vitrified sewer-pipe line, laid with cemented joints, connects the

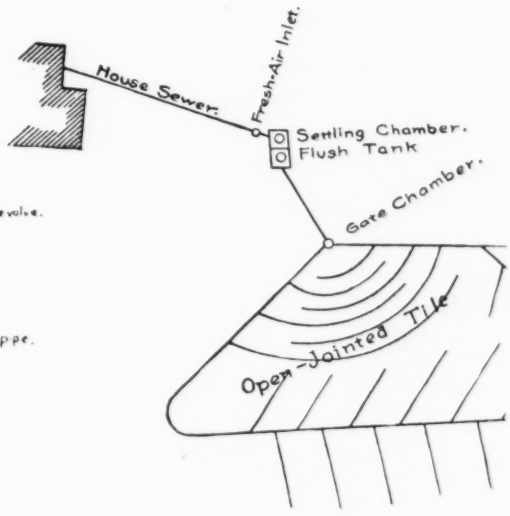


Fig. 13. Subsurface Irrigation for Slightly Sloping Ground.

flush tank of 300 gallons capacity with the gate valve (Fig. 16), and two distributing lines of 3-in. draintile, each about 450 ft. long, are connected to this gate valve. The character of the surface determined the direction the lines should take to give them the very slight fall required. The joints were first covered with paper to keep the dirt out of the tile until the soil became compact. The trench was partially filled with crushed stone, after the tile had been laid, to increase the porosity of the soil, and then completely filled with earth and the sods replaced. (See Fig. 17.) At the end of each branch a little pocket of stone was placed. This system was designed to have the flush tank empty about every twenty-four hours. The distributing systems were to be used alternately, a week at a time. The gate used to change the flow from one line to the other was operated by hand, being swung from one side of the cast-iron cylinder to the other, which took about one second of time. By this means one drain is given a complete rest of a week to allow the purification of the soil.

Four and one-half cents a foot was paid for this draintile, and the price paid for the gate valve was $10, making the material for this subsurface system cost $46.50.

Fig. 14 shows another subsurface system. The settling chamber and flush tank are located about 40 ft. from

the house. There is an advantage in placing these as close to the house as practicable. If there is any tendency for sediment to collect in the sewer, the shorter this part of the system is made the less chance there is of trouble from the stopping up of the sewer. If the system is in good working order there should be no odors. The distributing system was located on a very steep side-hill, which accounts for the method of laying the drains so as to have the branch lines of about the same length, and the average fall not much more than 2 in. in 100 ft. The 6-in. sewer pipe is laid with cemented joints, with a fall of 4 in. to the 100 ft. each way from the dividing chamber. To completely empty the 6-in. sewer pipe the 3-in. drains should connect with the 6-in. pipe at the bottom, as shown in Fig. 18.

A subsurface system adapted to level ground is shown in Fig. 15. The two underground tanks are used for the sewage and a separate chamber is provided for the siphon. These tanks are placed within 15 ft. of the house. As nothing is visible except the iron cover of the tanks and the system is water-tight to the place where the disposal tiles are laid, there is no sanitary reason that

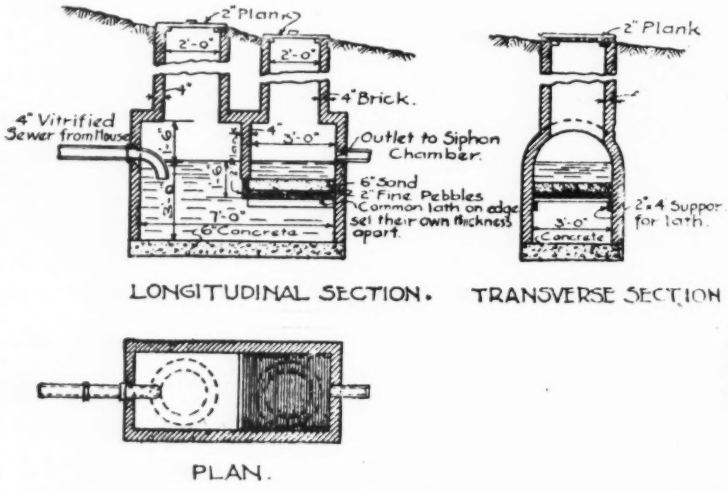


Fig. 12. Double-Chambered Tank of Brick.

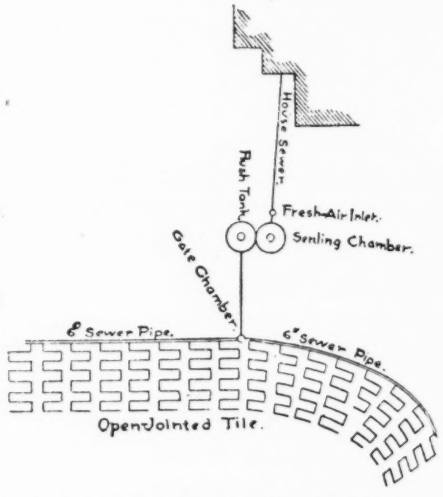


Fig. 14. Subsurface Irrigation for Steep Hillside.

would require an increased distance. The tile lines are divided into three series leading from the gate chamber, so that the ground utilized by two lines is given a complete rest while the other line is in use.

DISPOSAL BY FILTRATION.

Filtration is only a more copious irrigation. The principle of purification is the same. The sewage must still be applied intermittently to allow of the renewal of the oxygen in the filter, and a preparatory treatment to remove the coarser organic matter is necessary to prevent deposits upon the surface of the filter-beds. An increased quantity of sewage will be purified if the surface of the filter is raked over to the depth of an inch every week. Filters 2½ ft. deep require more attention than those of greater depth, but with proper care they serve their purpose well.

A sand filter becomes more effective the longer it is in use, if the surface is kept in good condition. For a family of five, a filter bed with a surface of from 200 to 400 sq. ft. should give an effluent that is clear and odorless. Smaller beds can be used, but it means more care in keeping the filters clean and free from clogging, especially in winter. The filtering material should be 3 to 5 ft. deep and should be well underdrained. The experiments carried on at Columbus, Ohio, indicate that the best preparatory treatment to be used with filtration methods was afforded by the septic tank, which would hold an 8-hour flow. From these experiments it would seem that the capacity of the flush tank could be reduced at least one-half if a filter-bed was to be used instead of subsurface irrigation. A section of a filter-bed is given in Fig. 19.

To secure an even distribution over the entire surface of the bed, a 6-in. galvanized roof gutter, pierced every 3 in. with ¼-in. holes, could be laid on the surface extending the entire length. Four-inch draintile laid with open joints could be used, or a wooden trough having openings every 2 ft. on each side.

SURFACE IRRIGATION.

The sewage of a house that has a complete water carriage system is not offensive at first, because the organic matter is so small a percentage of the entire amount. If the liquid wastes can be discharged upon the surface of the ground without undue retention, this method of disposal will be without offense and entirely effective. Where plenty of land is available it is by far the cheapest and simplest method that can be used. A series of outlets should be provided to avoid saturating the ground and, as in subsurface irrigation, the application should be intermittent. This is obtained by the use of a flush tank discharging automatically by means of a siphon into a pipe leading to the disposal ground. The number of the outlets will depend upon the slope of the ground and the amount of the discharge, but it is well to have three groups of outlets to be used in succession, allowing several discharges upon one field before the gate is changed to bring another group into use. A gently sloping surface of grass land is adapted to this form of disposal without any previous preparation, except the placing of a small platform of stones or brick laid close together at each outlet to prevent the washing away of the earth and aid in spreading the flow over a greater area. The flush tank should be designed to discharge in from 12 to 24 hours by means of an automatic siphon.

CARE OF THE DISPOSAL PLANT.

It must not be expected that once a system is installed there is nothing more to be done. Any method of disposal will require a slight amount of regular attention,

but the results will amply compensate for the time and the money expended. Every part of the system, including the siphon, needs attention and occasional cleaning. Of all methods devised by the sanitary engineer for purifying sewage its application to land has secured the best results. While this method can not be used by many

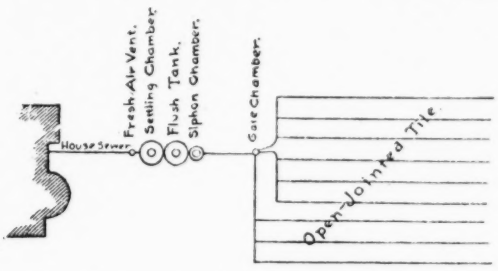


Fig. 15. Subsurface Irrigation for Level Ground.

cities on account of the impossibility of securing a sufficient amount of suitable land, it is especially adapted to the needs of the farm.

DISPOSAL OF ASHES, GARBAGE AND MISCELLANEOUS REFUSE.

It is the regular taking care of the little things that advances housekeeping to a fine art. The most promptly

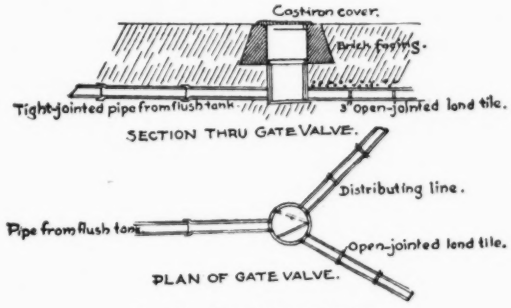


Fig. 16. Plan of Gate-Valves.

and regularly all refuse of the household is harmlessly disposed of the better for the healthfulness and comfort of the home. If the ashes are kept free from organic wastes they can be used to advantage on the garden

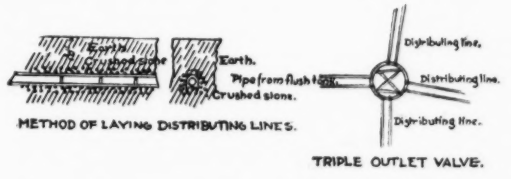


Fig. 17. Method of Laying Distributing Lines.

walks or to fill up low places. When taken from the stove or furnace they should never be stored in wooden boxes or barrels or in a fixed ash pit, but in a galvanized

Fig. 18. Distributing-Tile Connection.

can, not too large to be easily emptied, that is fitted with a tight lid. Many serious fires have been started from the inexcusable carelessness of using a wooden receptacle for ashes.

The kitchen refuse from the preparation of the food can be saved for the pigs and chickens. It should be collected in galvanized iron pails furnished with tightly closing covers to prevent exposure to the sun and to avoid flies. These pails should be washed and scalded each time they are emptied, and once a week, especially

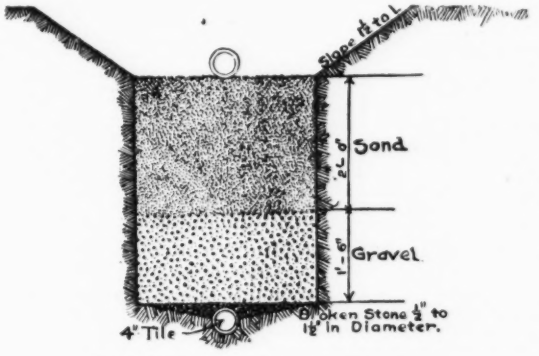


Fig. 19. Sectional View of Filter-Bed.

in summer, they should be rinsed with carbolic acid—a teaspoonful to a pint of water. Whatever can not be used in this way should be dried and burned.

Things that the junk peddler will take (old tin, iron, leather, rubber, etc.) should be cleaned and stored in sacks in a dry outhouse to await his next visit. No damp or decaying rubbish should be left in dark or out-of-the-way places.

(To Be Continued.)

CONVENTION DATES.

Jan. 26 and 27, 1910.—Annual convention of the Illinois Master Plumbers' Association, at Springfield, Ill. Headquarters at the Annex of the St. Nicholas Hotel. President, W. J. Lang, 538 E. Division St., Chicago; secretary, W. C. Haviland, Coulter block, Aurora, Ill.

Feb. 15 and 16, 1910.—Nineteenth annual convention of the Ohio State Association of Master Plumbers, at Youngstown, Ohio. The sessions will be held at Knights of Columbus Hall, and headquarters will be established at the Tod House. President, J. L. Riley, 157 McDonough St., Dayton, Ohio; secretary-treasurer, Eb Ellen, 4714 Central Ave., S. E., Cleveland, Ohio.

Mar. 7 and 8, 1910.—Annual convention of the Kansas State Association of Master Plumbers, at Kansas City, Kans. Headquarters at the Grund Hotel. E. D. Draper, 730 Minn. Ave., Kansas City, Kans., secretary.

Mar. 8 and 9, 1910.—Annual convention of the New York State Association of Master Plumbers, in New York City.

Mar. 8 and 9, 1910.—Annual convention of Oklahoma State Association of Master Plumbers. The place not yet decided upon. The officers of the association are: President, Gus Hanson, Oklahoma City; vice-president, W. V. Roesch, Shawnee; secretary, D. W. Fitts, Oklahoma City; treasurer, Walter Newman, Shawnee, Okla.

March 14, 15 and 16, 1910.—Annual convention of the National Association of Jobbers of Wrought Pipe and Fittings, at the Fort Pitt hotel, Pittsburgh, Pa. The officers of the association are: President, A. E. Ford, Philadelphia; first vice-president, C. H. Simmons, New York City; second vice-president, O. F. Felix, Pittsburgh; treasurer, C. G. Cornell, jr., New York City; advisory secretary, T. James Fernley, Philadelphia; secretary, Thos. A. Fernley, Philadelphia.

JONES FILLS HIS HAND WHEN CAUGHT BY THE GAME.

By Phoenix.

Jones sat, tipped back in his chair, in the front office, smoking a black cigar. His feet were upon the desk and his reflections were apparently far from pleasant, for a scowl was upon his face and now and then he wagged his head vigorously, as though holding a debate with himself.

Affairs were not running smoothly in the business and his work was properly "hung up." The $10,000 plumbing contract in the big hotel was badly tied up, and on several other plumbing jobs the journeymen had, as Jones expressed it, "not only used up all the time figured, but were a-eatin' into the profits." A few months before this time, Jones had placed his son, who had been away to a technical school, in charge as foreman, thinking that the boy would take an interest in the business and make things jump. It's true that young Jones jumped things, but it turned to be continually in the wrong direction and this morning the old man was completely tired out and disgusted with the continued mix-up. Plumber after plumber had been "fired" from the shop in the last few months and new ones taken on at random, to fill the vacant places and yet the work dragged.

Now the trouble, when sifted, appeared to come down to the want of foresight upon the part of the foreman and this was a bitter pill for Jones to swallow, as he had spent a lot of money on his boy and expected to get some returns.

The trouble with young Jones was that he could not run the men. He was a good workman himself and understood the details of the work all right, but bunch the business and require a general direction of the whole and he was off his feet in a moment. The men fairly ran away from him and the dickens was to pay all around. Jones had tried, at various times, to boss his men personally, but had fallen down, for Jones "had ways" and many of them were far from pleasant. He never had a pleasant word for anybody while "on the works."

One of his leading principles in handling the boys seemed to be that a sharp word or a sarcastic reflection would make a man jump into the work and simply eat it up. Now, anyone who has ever been along the rocky road of the craft and worked in a shop which employed a big gang of men knows just about how such a line of treatment would pan out.

So Jones reflected, that September morning and put his brains to the task before him. He saw very clearly that both he and his son had failed in running the jobs and he had sense enough to know that unless he struck a proper solution, the business would soon go on the rocks.

Therefore he decided, after thinking matters over, that it was up to himself to find a man who could make things move.

He saw that while he could get out and dig up almost any amount of work (for be it understood that Jones had good points, too; he was a salesman) he simply could not be the whole works. Now, it is a mighty good thing to find out one's shortcomings, even at the eleventh hour and it is an added point for future success if one can decide to give these same weaknesses a knockout blow. So he got up from his chair and said to the stenographer, "I shall be out of town all day," and going over to the railroad station he bought a ticket for a city about 100 miles down the line, arriving at his destination a little before the noon hour.

Now, in this city there lived a friend of Jones, who was a plumber, and had his bump of common sense developed to an unusual degree. The rough edges of his disposition were pretty well worn off, for Brown had been around the country some in the past 12 or 15 years and though at present not working, he had had charge of many a good job.

After dinner Jones succeeded in locating Brown and broached the subject nearest to his heart.

"See here, Brown, I am in the deuce of a fix just now."

"How's that?" asked Brown, "I thought you were doing fine—all the work you could do, and then some. You ought to lay by a good bunch of the long green this year."

"I wish I could," said Jones, "but I want to tell you that things look mighty uncertain right now. If you wasn't such an old-time good friend, Jack, I wouldn't be telling you all this, but as it is, I want to get hold of you. I need a foreman and I know you are the man that can hold down the job. I don't have to write nor ask for any recommendations. Now come down to my shop and see if you can't help me work matters out, for the work is simply thoroughly on the bum."

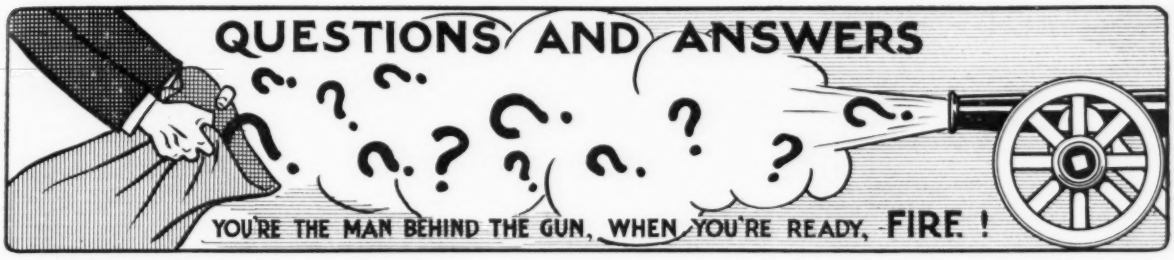
Brown studied a few moments. "Jones, did you ever see anyone try to get a mule over a bridge when the beast objected? Well, the mule simply don't cross. He sulks and kicks, but over that bridge he simply will not go, and the easiest way is to blindfold the mule and back him over the bridge. Now, you have got to get over the bridge and maybe I am the one to do the leading.

"I'll go up to your place and take charge, but I shall simply run things after my own fashion and if you do not agree, why, get some one else to tackle your game. I shall hire and fire just whom I please and my wages will be $150 per month as a starter. What you need is some common sense, tact and consideration injected into your business and it will be all right."

"Well, Jack, that's mighty plain talk and I'd hate to take it from everybody, but things can't be any worse and I guess perhaps you can make them a whole lot better. Pack up your grip and come along. I'll give you a free rein." The next day Brown showed up on the job.

ST. JOSEPH PLUMBER SIGNS EIGHT MILLION DOLLAR CONTRACT.

If anybody wants to buy a first-class plumbing business, he should apply to John W. Muir, former police judge in St. Joseph, Mo., as from present indications he will soon be the possessor of one of the best shops in that city, according to the "St. Joseph Gazette." A well-known plumber opened negotiations with Judge Muir for his services. He told the lawyer he would want him for at least a month, and asked his fee. The judge said he would work for a cent the first day, the amount to be doubled each day for 30 days, but the plumber thought that was hardly fair to the lawyer. "That's all right," replied Muir, "You sign a contract for one cent the first day and double it each day for 30 days and I agree to devote my entire time to your service. The contract was drawn and the plumber signed it. Now he is wondering how he is going to pay the $8,637,385.13 called for by the contract at the expiration of 30 days. The only thing he can do is turn over his business to the judge as part payment.



TO OUR READERS.

During the past year this department has grown with great rapidity and we trust that our many readers have enjoyed the direct and simple manner in which our practical man deals with the problems which we turn over to him. Many letters come in each week from all parts of the country and because we are receiving such a large number we feel that we must institute some kind of a system, or at least ask for some consideration along certain lines.

You must all appreciate that the editor of this department is many times handicapped at the very start, when giving information of various kinds, from the fact that he can not see the job in actual operation. Therefore he should have as accurate a word-and-pen picture of it as it may be possible for him to procure.

It need not be done with the minuteness of a blue print nor with the correct language of a professor, but the penmanship, at least should be plain enough to be read and not guessed at.

Upon the writer's table this very moment there is a letter requesting information, and in that same letter there are at least ten words, the meaning of which must be guessed at. Simply because some one was too careless to write plainly. Now consider the matter for yourself, what would you say in such a case? We do not desire to offend this man by returning his letter and asking for a translation and so must generalize in answering his question. Therefore, whatever may be your question, if written with pen and ink, please write as plainly as possible and on one side only of the paper. If some one were to come into your shop and ask you for an expert opinion that you would be willing to back up, about a certain plumbing or heating job, what questions would you ask such a party?

If he could make a drawing what would you require to be put into that sketch?

We receive many letters asking us the solution of perplexing points in our craftmanship, and when we come to get after the facts given they are few and far between. In such a case the answer, if given at that time, must be very general. A other times several inquiries are of a very similar nature, so much so that they can be combined and one general answer given which will cover the whole bunch.

Another point we desire to mention is that this department has outgrown its former proportions and we are compelled to hold back letters for a considerable period, as it is not possible to publish all.

Therefore be patient and we will reach you all in due time. We suggest that, when the ocasicon demands, a clear sketch of the job be forwarded with the inquiry. Consult some of the many plans that have been published in this paper from time to time and you will be able to put up one that is comprehensive (in case you are not an artist with the pencil). A plain drawing done with a pencil will answer the purpose. In case advice is desired as to radiation, the size and exposure of the house and rooms should be given. For instance, some one writes: "How much radiation will it take to heat an 8-room house?"

There are ten thousand times ten, 8-room houses and then some, in this country. How can we be expected to know the size of this particular house? One 8-room house might be heated with 400 ft. of radiation and another might take 800. These few remarks are intended in the kindest spirit and are not written for the purpose of criticizing any one person, but are given as a general tip to all. Let us have something to draw to, a few points upon which to base a comparison and we will try to do the rest, and if it happens that your information is not sufficient to meet our requirements do not be surprised if we write for more before your question is printed.

HOW MAY THE DRAFT IN A BOILER BE DETERMINED?

Editor "Domestic Engineering":—What is a good draft on a heating boiler? That is, what is the least permissible draft in a boiler fire-box for satisfactory results?

Practically all boilers have the same ratio of smoke-pipe area to grate-area, but it is a well-known fact that some boilers will give satisfactory service with a given draft where others will fail. Much has been written on the importance of good draft, but I can't find any specific mention of what a good draft is.

Recently I have been testing drafts with a draft gage. In a furnace fire-pot with coke fuel I found .07 of an inch water pressure was a good draft.

On another job I found .3 of an inch draft in the chimney, but only .03 in the boiler fire-pot when the lower-draft door was open. This boiler is not operating satisfactorily. On another boiler job I found .15 of an inch draft in the chimney, but only .02 in the boiler fire-pot when the lower-draft door was open. This boiler also was not doing as well as it might, although the flues are designed especially for poor draft conditions, being only about one-third as long as in the other boiler. If this inquiry comes to the notice of any of your readers who have any similar data I trust they will be sufficiently interested to forward it to your valuable paper.—J.

Peoria, Ill.

This is a question upon which there is a chance for some of our friends to make public some of the results of their experience and knowledge. We will start the discussion by stating that in one of the works we consulted we found the statement that each pound of coal requires about 300 cu. ft. of air for its complete combustion. It is also stated that if the boiler's flue-area is

too small, satisfactory results will not be obtained, regardless of draft.

We presume in the latter case the word draft refers to the chimney. Our correspondent has stated the kind of fuel used in one instance only. We trust to be favored with fuller information regarding the other boilers which were mentioned.

HOW SHOULD THE SERVICE-BOX BE SET?

Editor "Domestic Engineering": Many times the service-boxes get badly stopped up with mud and have to be dug up. Can you suggest any method by which better results can be obtained than from the usual manner of setting?

Birmingham, Ala. Highland.

We would suggest that the service-box be placed on some kind of a foundation as shown in the drawing (Fig. 1). If brick are not available, flat stones can be used and cement should be used to render the foundation

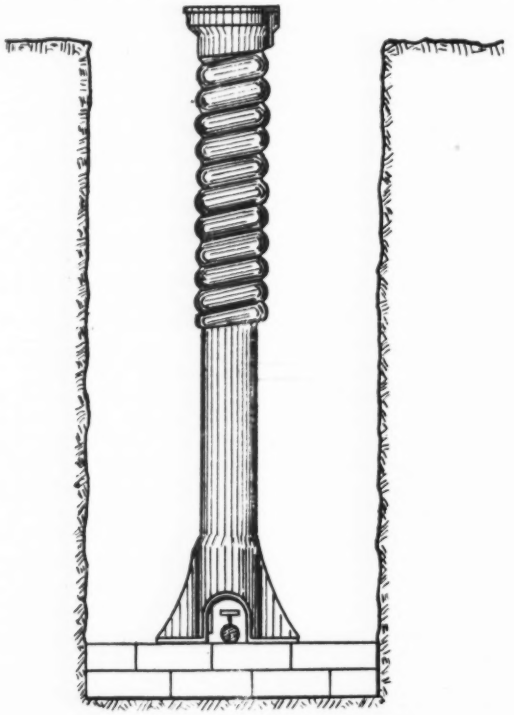


Fig. 1. How to Set a Service-Box.

more solid. If the dirt is of such a character that it washes badly around the bottom of the box for a couple of feet up be sure to tamp with gravel. If no gravel can be found, brick may be broken up and used. After the box is placed, and before this material is thrown in, the open spaces, indicated in the illustration, at the bottom of the box should be closed up. It is not advisable to do this with cement, as it may be necessary for some reason to remove the service-box. Be sure and see that the street key fits easily before the box is permanently set.

TWO CONNECTIONS TO THE RANGE BOILER.

Editor "Domestic Engineering":—I have a job where I desire to connect a range-boiler to two waterfronts, one in the basement and one on same floor with the range-boiler. I would appreciate some of your excellent suggestions in regard to this job. We read your questions and answers each week and get much practical benefit from them, and are greatly pleased with the increased size of the paper. Certainly one gets the worth of the money invested in a subscription to "Domestic Engineering."

Binghamton, N. Y. Delaware.

Thank you very kindly for the words of praise for the paper and our efforts. Keep an eye on the paper and note the improvements from time to time. Regarding the connecting of two waterfronts to one range-boiler we desire to state that many cuts of this particular manner of connection have been given in these columns from time to time. We have others which will be given as times passes, but many times these connections do not work in a satisfactory manner. The current of one waterback turns out to be stronger than the other and trouble results. This may happen if the pipe sizes on one waterback are run smaller in size than the other, or if the boilers are located at uneven relative distances. When all the various points are considered it may be stated that all these various annoyances may be avoided if the boiler is provided with such tappings that each waterback can be separately connected. This would do away with much useless work and figuring, and get results which are sought after, many times in vain, by the other methods.

WHO WILL FURNISH THE DATA REQUIRED?

Editor "Domestic Engineering":—In reference to Mr. Phoenix' article in the "Domestic Engineering," number 884, volume 49, I would like to ask about what would be the difference in expense in keeping up the heat in a circulating lavatory fixture supply in one residence of, say, 10 rooms, and in the heat and water lost in the regular manner of connecting such supplies.

The matter has been discussed once or twice between some of my customers and an architect, and the customers have been advised that the loss caused by the additional radiation of uncovered pipes would be greater than the loss of water and heat in the non-circulating system. If there are any data with reference to this matter I should like to know them.

The convenience of having the hot-water flow at once has, of course, been admitted, but both the architects with whom the question was taken up decided that it was a rather expensive matter, both in installation and operation.

This, perhaps, applies more particularly here in California, where only about one house in 500 has a heating plant installed. Respectfully, J. G.

San Francisco, Calif.

At present writing I have not the exact data at hand to quote accurately in response to this question, and would state that I will look the matter up in due time. However, the convenience of such a circulation as referred to in my article is admitted without question. I see no reason, where the circulating pipes are not in sight, why they should not be covered as would be done on a hot-water heating job. The fact that this is not the usual custom cuts no ice whatever.

The water is in the range-boiler, anyway, and the mere addition of what some 30 or 40 ft of ¾-in. pipe, well-covered, would hold, would not mean very much more water to be heated, and, remember this, the hot

water would always be on tap. So little cold water comes from the hot-water faucet in such a layout that the water must always be cooled in the bowl for use instead of throwing away from three to four gallons of water, as is done when the other method is made use of.

There is another point which I will mention that did not occur to me while writing before, and this is that on a fair-sized house there might be several fixtures requiring hot water; say the sink, laundry-tubs, two lavatories and the bath-tub. Now it is hardly possible that the hot water faucets of all of these fixtures would be turned on at the same time, yet such an occasion might arise. Say a 40-gal. range-boiler had been installed and the piping put in on the non-circulating plan. Now, on such a layout, with four or five faucets running, it would be nothing unusual to throw away from 12 to 20 gal. of cold water before any hot water at all came to the fixtures.

That would admit from 12 to 20 gal. of cold water to the range-boiler, or at least half of its capacity.

Now, were an additional amount of hot water desired immediately, to the amount of 22 or 25 gal., it could not be obtained, while were the job upon the circulating plan, plenty of hot water would still be in reserve in the range-boiler, because very little would have been wasted at the start. You see that this problem needs attention from all sides, so to speak. Phoenix.

WHAT IS SEWER-GAS?

Editor "Domestic Engineering"::—Being at all times an eager reader of your valuable paper, and taking particular interest in your questions and answers, and also the common-sense practical articles by Mr. Phoenix, who evidently must have been one of the boys at some time in his life, I wish to ask a question for which I do not seem to find a clear definition in any of the papers and books I have consulted.

Can you, or Mr. Phoenix, through the columns of the paper, give me a reasonable definition of "sewer-gas"?

At various times I have endeavored to explain this to my customers, but I generally get stalled about halfway up the grade. Thanking you in advance and awaiting the answer in due time, I remain,

Louisville, Ky. J.

At various times and places many tests have been made to discover the much discussed and dreaded "sewer-gas." Up to date it has succeeded in eluding discovery and it has been pretty clearly determined that, as a separate and distinct product, sewer-gas does not exist. That there are disagreeable odors in sewers no one denies, and that it is unpleasant to breathe these odors every one admits, but that there is a specific gas, called "sewer-gas," is not admitted any more by the best authorities. It is also believed that the chances for "direct bacterial infection through the air of drains and sewers is so slight as to be practically negligible," quoting directly from the report of the Sanitary Committee of the National Assoication of Master Plumbers.

From some of the conditions we have observed in various houses, factories and other buildings we can state that the inmates would have a better chance for health and life if they breathed the ordinary sewer-air rather than the air of their daily surroundings. Therefore, Mr. Plumber, when any one again asks you for a definition of "sewer-gas," tell that person there is no such gas as it has been understood in the past, and do your best to help crush this "hoodoo" which has followed the craft for so many generations. Phoenix.

INFORMATION INDEFINITE.

Editor "Domestic Engineering": We are sending herewith a sketch of a kitchen-boiler (Fig. 2), which we have installed but without obtaining satisfactory results. We would like to secure your opinion on this job.

Philadelphia, Pa. C. B.

We publish this drawing and letter, and in the kindest manner possible wish to assure C. B. that the information he sends us is exceedingly indefinite.

In the first place he merely says that the results are unsatisfactory. This might mean either too much or not

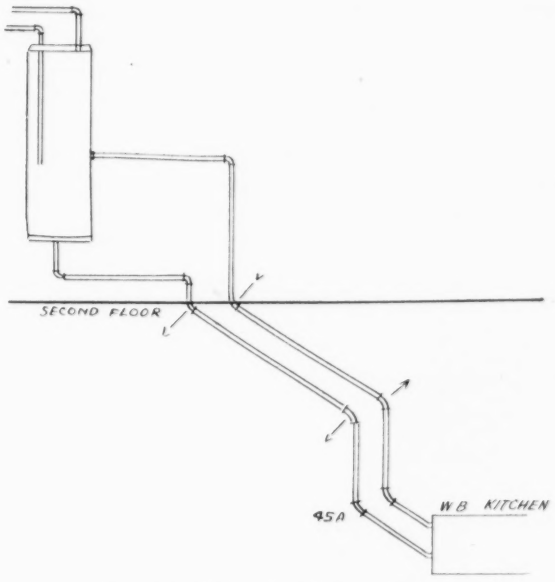


Fig. 2. Plan of Unsatisfactory Kitchen-Boiler Job.

enough hot water. It might also mean snapping and pounding noises and several other things. We assume, however, that there is a scarcity of hot water. Knowing neither the size of the tank nor water back, we can only venture the remark that the water-back is too small.

We do not believe, provided the pipes are reamed and ¾ in. in size, that the various turns on the pipe lines would hinder the circulation to any degree on this particular job, that is, if there are no traps.

On a heater similarly installed in the flat where the writer lives there is a connection between the coil and range boiler, also located upon the second floor, and there are many more turns on the pipe lines than are shown in this sketch. The distance between the coil and tank upon the writer's job is something over 70 feet, and I can say that we always have plenty of hot water in the 30-gallon tank. As there is no draw-off cock shown at any point on the above sketch, I can suggest that perhaps there is a stoppage in the pipes or water-back. With more information to draw to, I could probably give a more definite reply and should be pleased to do so if given the opportunity.

MIDDLE STATES.

Powell & Dorste, Anderson, Ind., have been awarded the contract for the installation of a heating plant in the new high-school building now being erected in that city. The consideration is $14,747.

Fitzpatrick & Hoepfner, Columbus, O., have been awarded the contract for the installation of a heating and ventilating system and a pumping plant at the new post-office in Toledo, O.

O. C. Perrin has opened a plumbing establishment at Durand, Mich.

The Lane-Pyke Co., Lafayette, Ind., has secured the contract for the installation of a heating and ventilating system in the new laboratory building now being constructed at the Purdue university. The contract price is $12,000. The new system will be a model of its kind and will include the latest and most improved methods and appliances. Prof. J. D. Hoffman designed the system.

Richards & Rhoads, Lincoln, Ill., have secured the property adjoining their plumbing establishment on North Sangamon St. in that city, and are remodeling it for the purpose of using it as a workshop.

The Pickerel-Schneble Co., Dayton, O., has been incorporated with a capital of $5,000 to take over and conduct the plumbing establishment of David Pickerel at 123 Valley St., in that city.

The W. L. Miller Heating Co., 9 Jackson Blvd., Chicago, will install a steam-heating plant in the Burlington railroad's roundhouse at Sterling, Ill.

Paul O. Keppelman, 628 North Front St., Reading, Pa., has secured the contract for the installation of a hot-water heating plant in D. K. Hill's new residence at Atlantic City, N. J.

W. A. Biddle will soon move his plumbing establishment into his new building on North Walnut St., Brazil, Ind.

John H. Rodgers, Council Bluffs, Ia., is planning the erection of a new building at Broadway and Twenty-second St. to be occupied by his plumbing establishment.

B. F. Gifford and George Gifford have purchased H. G. Nowling's plumbing establishment at Olathe, Kan., and will hereafter conduct the business under the name of Gifford Bros. Both men are expert plumbers.

WISCONSIN.

The D. & F. Kusel Co., Watertown, Wis., has sold its plumbing department to Doerr & Kusel, a recently organized firm, which has opened up a new shop at 115 Fifth St. Robert Doerr and Walter Kusel, the members of the new firm, were formerly in the employ of the D. & F. Kusel Co.

Walter Heil, a plumber in the employ of the Otto Biefeld & Co., Watertown, Wis., has been engaged as assistant engineer at the city pumping station. He is in line for the position of city plumbing inspector, when this position is created as now proposed.

Wheeler & Son, Wausau, Wis., have been awarded the contract for installing a steam-heating plant in the public library building at Antigo, Wis., at $1,732.75.

The J. P. Sullivan & Co., Stevens Point, Wis., has been awarded the contract for installing a new water supply system in the buildings at the county poor farm.

Daniel Danielson, Wausau, Wis., has been awarded the contract for installing a steam-heating system in the east side engine house of the fire department in that town.

MASSACHUSETTS.

Mayor Ashley, New Bedford, Mass., has held up the bill of $2,300 put in by Charles B. Kimball & Co., of Boston, consulting engineers on the heating and ventilating of the high school, on the ground that their employment was not authorized. Since filing the first bill the company has sent a second corrected bill of $1,600, but this has been held up by City Solicitor Barney, who has gone carefully over the records of the committees, and the city council, as to votes bearing on this matter and has found that the matter of employment of a heating and ventilating engineer to revise the plans was left to the architect. He finds that the city council did not authorize the work for which the bill is now presented and has so notified the Kimball firm.

Ernest M. White, Whitman, Mass., has gone to Altemonte Springs, Fla., where he has a large plumbing contract to carry out.

Hall & Torrey, Rockland, Mass., have the contract for installing a steam-heating plant, a range, a hot-water boiler and a bath-room in the Congregational parsonage.

Contracts in connection with the proposed new North End school house at New Bedford, Mass., have been placed as follows: Heating and ventilating, John Perra, New Bedford, $9,175; plumbing, Jeremiah Coholan, New Bedford, $5,742.09; vacuum cleaning system, Jeremiah Coholan, New Bedford, $1,950. The contracts for the proposed new high school have also been placed and signed. The plumbing and vacuum cleaning contract went to Jeremiah Coholan and the heating and ventilating contract was secured by L. W. Taylor, Boston.

The store of Ernest Harnois & Co., plumbers, at 317 Broadway, Wyoma Square, Lynn, Mass., was entered by burglars one night recently and money, a fur coat and other articles belonging to the proprietors were stolen.

The school committee at Fitchburg, Mass., is to ask the city council for an appropriation for a new heating plant in the Goodrich-street school. The present heating apparatus has been in continuous service for 18 years and it is claimed has passed its stage of usefulness.

MAINE.

The new city hall building commission, Portland, Me., has awarded the contract for steam heating and ventilating the new city hall building to Cleghorn Company, Boston, for $45,062, the amount of the bid submitted recently by the company in competition with several others. The Cleghorn Company was only a little lower than their nearest competitor.

B. Nadeau, Presque Isles, Me., is installing the heating plant in the new high school building in Washington, Me.

CONNECTICUT.

James E. Hall, who conducted a successful plumbing business at Wallingford, Conn., for several years, is soon to re-enter the trade and will open an establishment at 80 North Whittlesey Ave., in that town.

The contract for plumbing and heating the new residence of Albert Dow on Yale St., Bridgeport, Conn., has been awarded to F. & F. C. Booth.

Thos. S. Ainge, sanitary engineer of the Michigan Public Health department, has been proposed as the best man to make a trip to Germany for the purpose of studying German methods of preventing the contamination of streams by the waste from beet-sugar factories. Attorney General Bird recently received an offer from the factories at Caro and Blissfield that they would pay the expenses of sending a state official to Germany to ascertain the best methods of protecting the streams. It is believed that Germany has some satisfactory method of avoiding this contamination as it has been in the above industry since early in the seventeenth century. Mr. Ainge is a member of the American Society of Inspectors of Plumbing and Sanitary Engineers and he is well known to the readers of "Domestic Engineering" as the author of several series of technical articles along the line of modern sanitation.

An Analysis of the Plumbing Codes of Thirty-five of the Principal Cities in the United States*

By Thomas S. Ainge, Sanitary Engineer, Michigan Department of Health.

(Written Expressly for "Domestic Engineering." All Rights of Republication Reserved.)

TRAP-VENTS.

The specifications relative to trap-vents are shown in Exhibit IX.

Generally Compulsory.—From the standpoints of simplicity and economy, the general use of trap-vents, particularly in buildings in which there are many plumbing fixtures, is very objectionable; and this view is shared by sanitarians in general, and by very many members of the plumbing fraternity. Numerous forms of traps have been designed, and many methods instituted, for overcoming the danger from siphonage in plumbing work, notwithstanding which, the codes under consideration, and a large majority of the codes of other cities, make the general use of trap-vents compulsory. This may be accounted for partly by the fact that the study of the several conditions under which the siphonage of traps may occur, and the testing of traps of every kind and under the varying conditions met with in practice, have not progressed to the point where the wholesale discarding of trap-vents may, by many persons, be deemed a safe proposition.

Conditions Under Which They May Be Omitted.—In 22 of the codes under consideration, provision is made for the omission of trap-vents under certain conditions, principally where the traps are located on upper floors, or above the traps of any other fixtures, and are within a given distance from the vertical soil or waste stack into which they discharge.

Summarizing the provisions of the several codes relative to this subject, we find that trap-vents may be omitted in certain cities under one or more of the following conditions:

From the traps of fixtures on upper floors and above the traps of any other fixtures—(1) If within 5 ft. of stack and connection with the latter is not more than 18 in. below the trap; (2) If within 5 ft. of stack and the latter has adequate extension above the roof; (3) If within 3 ft. of stack; (4) If within 2 ft. of stack and the latter has adequate extension above the roof; (5) In the case of series of fixtures one above another; (6) Where one or two water closets are within 8 ft. of stack; (7) Where a water closet is within 5 ft. of stack; (8) Where two or three water closets are on a 4-in. stack and each trap is within 3 ft. of stack; (9) Where a water closet is within 2 ft. of stack; (10) Where a toilet or bath room contains one water closet and not more than three other fixtures, and the water closet has an approved trap, or fixture, and is within 5 ft. of the stack.

From the traps of fixtures on lower floors and below the traps of other fixtures—(1) Where two siphon water closets are on a 4-in. stack and the traps are within 3 ft. of stack; (2) Where a water-closet is within 5 ft. of stack.

From the traps of fixtures where there is but a single fixture in a building—(1) If within 5 ft. of stack and the latter has adequate extension above the roof; (2) If within 3 ft. of stack; (3) In old buildings where resealing traps are used.

From the traps of water-closets—(1) In the case of those of the washout or siphon type, where the bend under the fixture is ventilated by any other fixture; (2) If within 5 ft. of stack; (3) If within 9 ft. of stack, but not where located in cellar or basement; (4) In the case of those of the siphon-jet type, where the bend is ventilated by the 2-in. vent of any other fixture and the trap is within 5 ft. of stack; (5) On any two floors in buildings not over 3 stories in height; (6) In basements; (7) When attached to the yoke system of ventilation; (8) If within 4 ft. of stack.

From the traps of fixtures in general—(1) If within 3 ft. of stack and approved traps are used; (2) If within 3 ft. of stack, or drain, and the stack has adequate extension above the roof; (3) If within 1 ft. of stack and resealing traps are used; (4) In the case of old work where vent is impossible and approved traps are used; (5) Where continuous vent is impossible and approved traps are used; (6) Where ventilation is impossible and non-siphon traps are used; (7) Where approved anti-siphon traps are permitted to be used; (8) Where a toilet or bath-room, containing one water-closet and not more than three other fixtures, is located on one floor only, and the water-closet has an approved trap or fixture and is within 5 ft. of stack; (9) Where the aggregate of all branches above any fixture does not exceed two-thirds of the area of stack and the trap of the lower fixture is within 5 ft. of stack; (10) Where two fixtures on the same floor discharge into a double Y and the traps are within 5 ft. of stack; (11) If within 5 ft. of house-drain; (12) On all runs within 8 ft. of stack; (13) In the case of yard closets and sinks within 7 ft. of stack; (14) In the case of a drum-trap of a bath-tub adjacent to a lavatory if the traps of both fixtures are connected with a 2-in. stack; (15) Where the centers of 1¼ and 1½-in. traps are within 24 in. and of 2-in. traps within 30 in. of stack; (16) Where 2-in. shower-bath traps, above basement or cellar, are within 5 ft. of stack and the latter has an adequate extension above the roof; (17) Where trap of shower-bath in cellar or ground floor is inaccessible by reason of the pavement; (18) Where fixtures are in outbuildings separate and 10 ft. distant from the main building; (19) Where slop sinks are located outside of buildings.

Materials.—The importance of a careful selection of materials for trap-vents is emphasized by the fact that, as water will not be likely to flow through any part of the same, a leak due to a defect in the pipes or fittings would not be easily detected; and by the further fact that serious stoppages may occur in the ventilating

*The first four installments in this series of articles were published in the issues of May 29, September 18, October 9, and November 6, 1909. These back numbers can be obtained for 10 cents a copy. During the publication of these articles, changes are liable to be made in some of the codes, and the author will be greatly obliged if those who have jurisdiction over plumbing in the cities under consideration will notify him of any changes which may be made and send him particulars of the same.

EXHIBIT IX—TRAP-VENTS

LIST OF THE THIRTY-FIVE CITIES AND THEIR INDEX NUMBERS.

Every black number in this exhibit stands for a city and shows that the specification after which it appears applies in that city. 5 stands for Chicago: 35 for Worcester.

1. Allegheny, Pa.	**10.** Fall River, Mass.	**19.** New Orleans, La.	**28.** St. Louis, Mo.
2. Baltimore, Md.	**11.** Indianapolis, Ind.	**20.** New York, N. Y.	**29.** St. Paul, Minn.
3. Boston, Mass.	**12.** Jersey City, N. J.	**21.** Omaha, Neb.	**30.** San Francisco, Cal.
4. Buffalo, N. Y.	**13.** Kansas City, Mo.	**22.** Paterson, N. J.	**31.** Scranton, Pa.
5. Chicago, Ill.	**14.** Louisville, Ky.	**23.** Philadelphia, Pa.	**32.** Syracuse, N. Y.
6. Cincinnati, O.	**15.** Milwaukee, Wis.	**24.** Pittsburg, Pa.	**33.** Toledo, O.
7. Columbus, O.	**16.** Minneapolis, Minn.	**25.** Providence, R. I.	**34.** Washington, D. C.
8. Denver, Col.	**17.** Newark, N. J.	**26.** Rochester, N. Y.	**35.** Worcester, Mass.
9. Detroit, Mich.	**18.** New Haven, Conn.	**27.** St. Joseph, Mo.	

Trap Vents Generally Compulsory.

Trap vents are generally compulsory in all the 35 cities under construction.

Conditions Under Which Trap Vents May Be Omitted.

Not stated: **11-12-13-15-17-20-22-23-24-27-28-29-31.**

Not stated for new work. In old work, where it is impossible to get revent for a trap, the board of health may designate the kind of trap to be used.—**1.**

Where fixtures are not over 3 ft. from vertical stack and approved traps are used; also where waste pipes discharge on surface of ground and fixtures are not over 8 ft. from vertical stack.—**2.**

Where a continuous vent is not practicable, approved non-siphon trap may be used. Traps for upper fixtures on soil or waste pipe need not be vented if within 5 ft, horizontally, of stack and connection with stack is not over 18 in. below water seal of trap. In the case of batteries of fixtures with yoke vents.—**3.**

Where a single fixture on an upper floor is within 5 ft. of main line and has separate run to sewer. Washout and siphon water-closets need not be back vented where bend or ferrule is vented by any other fixture.—**4.**

Where a single fixture is located in a building, or on the top floor of any building, and the trap is not more than 5 ft. from a well-ventilated soil or waste pipe; or where a toilet or bath room, having not more than one water-closet and three other fixtures, is located on one floor only, or on the top floor of a building, and the water-closet is set not more than 5 ft. from the vertical soil pipe. Provided, that, in the case of water-closets, an approved fixture or trap shall be used in such cases. —**5.**

In special cases, other approved appliances may be used. —**6.**

Where there is only one fixture on a particular stack and the fixture trap is within 3 ft. from the stack.* Where the topmost water-closet is within 3 ft. from a stack.* Where the aggregate area of all branches discharging into a stack above any fixture does not exceed two-thirds of the area of the stack and the trap of the lower fixture is within 5 ft. of the stack.* Where two fixtures on the same floor discharge into a double Y or TY, and the traps are within the 5 ft. limit.* Where fixtures on a house drain are within the 5 ft. limit.*—**7.**

When water-closets are not more than 5 ft. from stack.—**8.**

Where there are a series of fixtures one above another, the upper fixture traps need not be vented. All runs under 8 ft. from stack need not be vented.—**9.**

Except when otherwise permitted by Inspector of Plumbing.—**10.**

For yard water-closets and sinks not over 7 ft. off the main line, and for inside fixtures not over 3 ft. from drain, soil, or waste pipe. Provided, such main line, drain, soil or waste pipe is continued to roof of ample size to prevent the siphonage of traps.—**14.**

*There seems to be a discrepancy in the limit of distance between the trap and the stack, both 3 ft. and 5 ft. being mentioned.

Where a water-closet is not more than 2 ft. from stack and there is no waste pipe discharging into stack above.—**16.**

Where "Sanitas" traps are permitted to be used; and where water-closets (not located in basements) are not more than 9 ft. from soil pipe.—**18.**

Where two siphon jet or wash-down water-closets are on a 4 in. stack, and each is within 3 ft. of stack, lower trap need not be revented. Where three water-closets are similarly installed, lowest trap only need to be revented. Where one lavatory is near bath tub, and both traps are directly connected to a 2 in. stack, drum trap of bath tub need not be revented. Where the centers of 1¼ in. and 1½ in. traps are not more than 24 in. and of 2 in. traps not more than 30 in. from stack. Where ventilation is impossible and non-siphon traps are used.—**19.**

Where a water-closet is on top floor and within 5 ft. of main stack; or on lower floor, with another water-closet above it. Where a siphon jet water-closet is revented by another set of fixtures which require a revent, or combined revent, of not less than 2 in., and the water-closet opening and vertical waste to fixtures are not more than 5 ft. apart.—**21.**

Where approved anti-siphon traps are permitted to be used.—**25.**

Where 2 in. shower bath traps above basement or cellar are not more than 5 ft. from a ventilated line. Where one or two water-closets are; 1. On upper floor and not more than 8 ft. from stack; 2. On any two floors in buildings not over three stories high; 3. In basements.—**26.**

Where a fixture is located in an outbuilding 10 ft. distant and separate from main building. Where waste from fixture discharges into open hopper, slop sink, or deck-trap, not more than 5 ft. away.—**30.**

Where water-closets are attached to the yoke system of ventilation.—**32.**

Where a single fixture, other than a water-closet, is located in an old building, and there are no fixtures on floors above, or below same, but resealing trap must be used. Where a fixture trap is not more than 1 ft. from vertical stack, but resealing trap must be used. Where slop sinks are outside of buildings. Where a water-closet is within 4 ft. of main stack. Not required for floor or area drains.—**33.**

Where an upper or only water-closet is not more than 2 ft. from a well-ventilated soil pipe. Where the branch soil or waste-pipe from three or more fixtures is permitted to be extended as a vent. Where the paving renders the trap of a shower bath in cellar or ground floor inaccessible.—**34.**

Not stated (a proposed amendment to code provides for omission of back-vent of upper fixture and surface drain in cellar).—**35.**

Materials for Trap-Vents.

Lead, brass, loricated porcelain, enameled iron or galvanized iron.—**1-24-31.**

Cast-iron, galvanized wrought iron, brass or lead.—**2.**

Iron or brass. For short connections, where exposed to view, lead may be used.—**3.**
Not specified.—**4.**
Heavy cast-iron coated with tar or asphaltum, standard galvanized wrought iron, or lead where it is not concealed in partitions.—**5.**
Cast-iron, lead, copper, brass, or other approved material.—**6.**
Iron, brass, copper or lead.—**7.**
Extra heavy cast-iron, galvanized wrought iron, or lead. —**8-13.**
Cast-iron, lead, galvanized wrought iron or steel.—**9.**
Only galvanized wrought iron mentioned for pipes of 1½ in. and over.—**10.**
Only lead mentioned.—**11.**
Extra heavy cast-iron, galvanized wrought iron, lead, brass or steel.—**12.**
Not specified. Black wrought iron pipe not to be used. —**14.**
Extra heavy cast-iron, galvanized iron, brass or lead. —**15.**
Only standard wrought iron and lead mentioned.—**16.**
Mains to be extra heavy cast-iron; branches of heavy brass, galvanized wrought iron, or "D" lead pipe.—**17.**
Cast or galvanized iron.—**18.**
"Standard" cast-iron for less than three stories, and extra heavy cast-iron for three stories or more. "Durham" system of pipes and lead may also be used.—**19.**
Iron, steel or brass.—**20-29.**
Extra heavy soil pipe, lead or galvanized wrought iron pipe.—**21.**
Extra heavy cast-iron, galvanized wrought iron, brass, or "D" lead pipe.—**22.**
Plain cast-iron, galvanized wrought iron or steel, or brass; short branches of lead.—**23.**
Cast-iron, galvanized wrought iron, or lead pipe.—**25.**
Cast-iron, wrought iron, steel, brass, or copper. Lead for short connections.—**26.**
Cast-iron soil pipe, galvanized wrought iron, or lead. —**27.**
Wrought iron, not less than 3 in. in diameter, lead, or extra heavy cast-iron.—**28.**
Cast-iron or galvanized wrought iron.—**30.**
Cast-iron, wrought iron, brass, lead, or steel pipe.—**32.**
Galvanized wrought iron or steel, cast-iron, brass, or lead.—**33.**
Cast-iron not less than 3 in. diameter, galvanized wrought iron, lead or brass.—**34.**
Cast-iron. Lead for short and exposed connections. (Proposed amendment to code substitutes brass for lead).—**35.**

Sizes of Trap-Vents.

Not less than waste pipe or trap, except in case of water-closets, which must be not less than 2 in. for length of 30 ft. and not less than 3 in. for length of over 30 ft. Main vents to be not less than combined areas of all branch vents connected with them.—**1.**

For water-closet, 2 in.; for other fixtures, at least 1¼ in., providing they are not over 25 ft. in length, in which case the 2 in. vent must be increased to 2½ in. or 3 in., and the 1¼ in. vent to 1½ in.—**2.**

Not less than waste pipe. For water-closets, 2 in. for not more than three fixtures and less than 30 ft. in length; if more than three fixtures, or over 30 ft. in length, 3 in. bore. For main vents, not less than 2 in. through less than seven stories; 3 in. for water-closets on more than three floors and for other fixtures in more than seven stories. Pipes of 1½ in. or less shall not exceed 30 ft. in length.—**3.**

For 3-in. or 4-in. traps, 2-in. vent; for 2-in. trap, 1½-in. vent; for 1¼-in. or 1½-in. trap, 1¼-in. vent. A 2-in. vent not allowed to relieve two bath rooms, where but one fixture discharges into water-closet bend, vent (and waste) must be at least 1½ in.—**4.**

Main vents for water-closets, with or without other fixtures: Under five stories in height, at least 2 in. diameter; five or six stories, 2½ in.; seven to eighteen stories, 3 in.; over eighteen stories, 4 in. Main vents for fixtures other than water-closets: Under five stories in height, at least 2 in. diameter; five to eight stories, 2½ in.; over eight stories, 3 in., but the lower six stories need not be over 2½ in., except in cases where the waste pipe exceeds 3 in. in diameter.—**5.**

Vents for more than twelve water-closets on any one floor to be at least 3 in. For water-closets in residences, vents to be 2 in.; for other fixtures, at least 1½ in. Horizontal vents in office buildings and factories not to exceed 40 ft. in length; in other buildings, 20 ft. Revents for water-closets or kitchen sinks, 2 in.; for other fixtures, same size as waste and trap.—**5.**

Not specified.—**6.**
Not fully specified.—**7.**
For water-closets over 5 ft. from stocks, 2-in. vents; for all other fixtures, vents of same size as waste pipe. Not more than 30 ft. of 1¼-in. vent may be used for one fixture, 30 ft. of 1½-in. vent for two fixtures, and not more than 30 ft. of "two pipes" (evidently meaning 2-in. pipe), in back venting. Water-closet vent pipes to be increased in size according to number of fixtures, at least ¼ in. for each additional fixture in small buildings and ordinary dwellings.—**8.**
To be not less than size of waste.—**9.**
Minimum 1¼ in. For water-closet vents 30 ft. or less in length, 2-in. pipe; for more than 30 ft. in length, 3-in. pipe; 1½-in. vents must not be over 15 ft. in length. —**10.**

For two fixtures, not less than 1½-in. pipe, and for three fixtures, not less than 2-in. pipe. For water-closets, not less than 2-in. pipe for length of 40 ft. or less, and 2½-in. pipe for an additional 20 ft. Provided, that vents for three or more fixtures, with waste of 3 in. or 4 in. in diameter, shall not be less than 3 in. for 20 ft. in length and 4 in. for over 20 ft.—**11.**

Main vent for one to nine sets of sinks, tubs or basins, 2 in.; ten to fourteen, 3 in.; fifteen, or over, 4 in. Main vent for one or two water-closets, with other fixtures, 2 in.; three to nine, 3 in.; ten to nineteen, 4 in. For branch vents, 1½-in. to 3-in. traps must have 1½-in. vent, and 4-in. trap, 2-in. vent.—**12.**

For fixtures other than water-closets, not less than 1¼ in.; for two fixtures, 1½ in.; for three fixtures, 2 in. For one to four water-closets, 2 in. for first 50 ft., then increased to 3 in. For more than four water-closets, not less than 3 in.—**13.**

Of same size as the waste. For water-closet trap, 2 in.; for two water-closets, 2½-in.; three or four water-closets, 3 in.; five or six water-closets, 4 in.—**14.**

Main vents: Minimum, 2 in.; for traps of water-closets in buildings of more than four stories in height, not less than 3 in. Back vents for water-closets: One to four fixtures, 2 in.; five to eight fixtures, 3 in. Back vents for sinks, laundry tubs, bath-tubs and urinals: One to five fixtures, 1½ in.; six to nine fixtures, 2 in.; ten to fifteen fixtures, 3 in. Back vents for wash basins: One to four fixtures, 1¼ in.; four to eight fixtures, 1½ in.; nine to fifteen fixtures, 2 in.; sixteen to twenty-five fixtures, 3 in.—**15.**

Main vents for water-closets: 2 in. for 40 ft., or less, and 2½ in. for an additional 20 ft. Mains for other fixtures: One or two fixtures, 1½ in.; three fixtures, 2 in.; three or more fixtures, with 3 in. or 4 in. waste, 3 in. for 20 ft. or less and 4 in. for over 20 ft. Back vents for traps up to 2 in., same size as waste; for traps over 2 in., 2-in. vents. Horizontal runs: Three water-closets, 3 in.; more than three water-closets, 4 in. —**16.**

Mains: One to six fixtures (not including water-closets) on one floor, 2 in.; two or three floors, 3 in.; four or more floors, 4 in. Branches: Water-closets and slop-sinks, 2 in.; all other fixtures, 1½ in.—**17.**

For water-closets, 2 in. For other fixtures, not less than size of waste pipes, with minimum of 1¼ in. for length of 20 ft. and 1½ in. or more for over 20 ft. in length. —**18.**

Mains: For two water-closets, 2 in. for length of not over 25 ft.; more than two water-closets, 3 in.; where over 30 ft. in length, diameter to be increased 1 in.; twelve water-closets, 4 in.; eight baths, basins, or similar fixtures, 2 in. Branches: One or two water-closets, 2 in.; five water-closets, 3 in.; two 1½-in. traps, 1½ in. for not more than 15 and when fixture is not over 8 ft. from main vent.—**19.**

For mains and long branches: Minimum, 2 in.; water-

EXHIBIT IX TRAP-VENTS Continued

LIST OF THE THIRTY-FIVE CITIES AND THE IR INDEX NUMBERS.

Every black number in this exhibit stands for a city and shows that the specification after which it appears applies in that city. 5 stands for Chicago: 35 for Worcester.

1. Allegheny, Pa.	**10.** Fall River, Mass.	**19.** New Orleans, La.	**28.** St. Louis, Mo.
2. Baltimore, Md.	**11.** Indianapolis, Ind.	**20.** New York, N. Y.	**29.** St. Paul, Minn.
3. Boston, Mass.	**12.** Jersey City N. J.	**21.** Omaha, Neb.	**30.** San Francisco, Cal.
4. Buffalo, N. Y.	**13.** Kansas City, Mo.	**22.** Paterson, N. J.	**31.** Scranton, Pa.
5. Chicago, Ill.	**14.** Louisville, Ky.	**23.** Philadelphia, Pa.	**32.** Syracuse, N. Y.
6. Cincinnati, O.	**15.** Milwaukee, Wis.	**24.** Pittsburg, Pa.	**33.** Toledo, O.
7. Columbus, O.	**16.** Minneapolis, Minn	**25.** Providence, R. I.	**34.** Washington, D. C.
8. Denver, Col.	**17.** Newark, N. J.	**26.** Rochester, N. Y.	**35.** Worcester, Mass.
9. Detroit, Mich.	**18.** New Haven, Conn.	**27.** St. Joseph, Mo.	

closets on three or more floors, 3 in.; for other fixtures on less than 7 floors, 2 in.; for less than 9 stories, 3 in.; 9 to 15 stories, 4 in.; 16 to 21 stories, 5 in.; more than 21 stories, 6 in. For branches: For 2-in. traps and less, 1½ in.; for traps over 2-in. diameter, 2-in. vents. For fixtures other than water-closets and slop sinks and for more than 8 stories, vents may be 1 in. smaller than specified.—**20.**

Water-closets, 2 in.; cesspools, slop sinks, or wash trays, 1½ in.; sinks, bar waste, bath tub, wash basin, or urinal, 1¼ in. Two or more revent pipes less than 2 in. must be increased to 2 in., where they are connected with each other. For every three water-closets connected to a revent pipe, revent pipe must be increased one size.—**21.**

Mains: For group of fixtures on two or more floors (not exceeding six), 2 in. (water-closets excepted); for three or four floors, 3 in.; for five or more floors, 4 in. Branches: Water-closets and slop sinks, 2 in.; all other fixtures, 1½ in.—**22.**

Vent, 1½ in.; maximum length, 25 ft.; traps served, 1 or 2; size, 1¼ in. to 2 in.

Vent, 2 in.; maximum length, 50 ft.; traps served, 1 to 5; size, 3 in. to 4 in.

Vent, 2½ in.; maximum length, 75 ft.; traps served, 6 to 9; size, 3 in. to 4 in.

Vent, 3 in.; maximum length, 100 ft.; traps served, 10 to 15; size, 3 in. to 4 in.

Vent, 4 in.; maximum length, 150 ft.; traps served, 16 to 25; size, 3 in. to 4 in.

Vent, 5 in.; maximum length, 200 ft.; traps served, 26 to 40; size, 3 in. to 4 in.

Vent, 6 in.; maximum length, 250 ft.; traps served, 41 to 60; size, 3 in. to 4 in.

Four 1½-in. traps considered equal to one 4-in. trap.—**23.**

Mains: For water-closets, 2 in. for length of 30 ft., and 3 in. or over for more than 30 ft. Sizes for branches not specified.—**24.**

For water-closets, 2 in. up to 30 ft. in length; 3 in. for more than 30 ft.—**25.**

For traps over 2 in. in diameter: Maximum length, 40 ft.: Diameter of vent, 2 in; No. of fixtures, 1 to 5; diameter of vent, 2½ in.; No. of fixtures, 5 to 10; diameter of vent, 3 in.; No. of fixtures, 10 to 15; diameter of vent, 4 in.; No. of fixtures, 15.

For 2-in. traps and smaller: Maximum length 40 ft.; Diameter of vent, 1¼ in.; No. of fixtures, 1 to 3; diameter of vent, 1½ in.; No. of fixtures, 4 to 6; diameter of vent, 2 in.; No. of fixtures, 7 to 14; diameter of vent, 2½ in.; No. of fixtures, 15 to 21; diameter of vent, 3 in.; No. of fixtures, 22 to 28; diameter of vent, 3½ in.; No. of fixtures, 29 to 35; diameter of vent, 4 in.; No. of fixtures, 36.

Vents to be increased every 40 ft.—**26.**

Same size as waste pipe up to 2 in. For 2-in. to 4-in. pipe, 2-in. vent. Where two fixtures connect with one vent, 1½-in. vent; three fixtures, 2-in. vent. For water-closets, 2-in. vent for each 40 ft. or less, and 1 in. additional for each additional 40 ft. or fraction thereof; provided, that vent for three or more fixtures, with 3-in. or 4-in. waste, shall not be less than 3 in. for 20 ft. of pipe or less, and 4 in. for over 20 ft. of pipe.—**27.**

Vents for sinks, bath tubs, wash basins, wash trays and other fixtures, to be same size as waste pipes. Vents to be increased in size every 20 ft. If more than four fixtures are in a row, horizontal vents to be increased in size in proportion to number of fixtures.—**28.**

For water-closets, 2-in. bore for 40 ft. or less; 3-in. bore for more than 60 ft. or less. (This last specification is evidently not what was intended.) For other fixtures, 1¼-in. vent for 20 ft. in length; 1½ in. for additional 30 ft.; 2 in. for additional 40 ft.; 3 in. for additional 60 ft. Where two fixtures connect into one vent, 1½-in. vent; three or more fixtures, 2-in. vent.—**29.**

Size of vent, 2 in.; No. of fixtures, water-closets, 1 to 3; small fixtures, 7. Size of vent, 2½ in; No. of fixtures, water-closets, 1 to 5; small fixtures, 10. Size of vent, 3 in.; No. of fixtures, water-closets, 6 to 8; small fixtures, 16. Size of vent, 4 in.; No. of fixtures, water-closets, 9 or more; small fixtures, 16 or more. Single 1½-in. traps may have 1½-in. vents. For water-closets discharging into double branch Y, 3-in. vent. For fixtures other than water-closets, discharging into double branch Y, where the soil pipe drop is not over 10 ft.; 2-in. vent for distance of 35 ft.: over 35 ft., vent to be 2½ in.; 1½-in. branch vents not to exceed 10 ft. horizontally. Deep traps, 2-in. vent.—**30.**

Mains: For water-closets, 2 in. for length of 30 ft., and 3 in. or more for over 30 ft. Sizes for branches not specified.—**31.**

For water-closets: One or two fixtures, 2-in. vent; three fixtures, 2½-in. vent; four to six fixtures, 3-in. vent; six to ten fixtures, 4-in. vent. Yoke vents for water-closets, 4 in.; for other fixtures, same size as waste.—**32.**

Mains: One to three water-closets, with other fixtures, 2-in. vent; three to six sets of such fixtures, 3-in. vent; more than six sets, 4-in. vent. Branches: Slop sinks, 2 in. vent; kitchen sinks, laundry tubs, urinals, or bath tubs, 1½-in. vent; other traps, 1¼-in. vent. Two 1¼-in. branches, 1½-in. vent; three 1½-in. branches, 2-in. vent; three 2-in. branches, 2½-in. vent; four 2-in. branches, 3-in. vent. Provided, mains or branches do not exceed 30 ft. in length. Over 30 ft. to be increased one size.—**33.**

Vent, 1½ in.; maximum length, 25 ft.; traps served, 1 or 2; size, 1¼ in. to 2 in.

Vent, 2 in.; maximum length, 50 ft.; traps served, 1 to 5; size, 3 in. to 4 in.

Vent, 2½ in.; maximum length, 75 ft.; traps served, 6 to 9; size, 3 in. to 4 in.

Vent, 3 in.; maximum length, 100 ft.; traps served, 10 to 15; size, 3 in. to 4 in.

Vent, 4 in.; maximum length, 150 ft.; traps served, 16 to 25; size, 3 in. to 4 in.

Vent, 5 in.; maximum length, 200 ft.; traps served, 26 to 40; size, 3 in. to 4 in.

Four 1½-in. or two 2-in. traps considered equal to one 4-in. trap.—**34.**

For one water-closet, 2-in. vent; two to four water-closets, 3-in. vent; upwards of four water-closets, 4-in. vent. For two or more vents from fixtures other than water-closets, 2-in. vent. No vent to be less in diameter than waste served.—**35.**

Connections of Vent with Trap.

At or near crown.—**1-12.**

Not specified.—**2-6-10-14-25-27-30-32.**

At crown.—**4-8-15.**

Not fully specified.—**7-13.**

At crown where practicable.—**11-21.**

As near crown as possible.—**20-24-28-29-31.**

Not to be connected with trap, but to be a continuation of the waste pipe and not over 18 in. from trap, except for water-closets when they must be connected with highest point of bend or trap.—**3.**

Crown venting not allowed. Where vent is through waste fitting, the latter must not be more than 3 ft. from trap. Washout water-closets to be revented above the floor line.—**5.**

Waste and not trap to be vented.—**9.**

Not to be at crown, but kept back on drain side not more than 2 in. and made with Y joint where practicable.—**16.**

As near crown as possible. Earthenware traps of water-closets or slop sinks to be vented from branch pipe just below trap.—**17.**

Not specified, except for water-closets, which are to be vented from bend or trap under floor.—**18.**

Not specified. Crown vented traps may not be used without special permission.—**19.**

As near to crown as possible, except earthenware traps, which must be vented from branch just below trap.—**22.**

From crown of trap, except earthenware traps, which are to be vented from branch below trap.—**23.**

To crown of trap. Water-closets at bend.—**26.**

As near to crown as possible. Earthenware traps to be vented from waste just below fixture.—**33.**

At crown, except for earthenware traps, which are to be vented from branch just below fixture.—**34.**

"Outside or below the trap."—**35.**

Termination of Trap-Vents at Roof and Base.

Not less than 4 in. diameter through roof. To be connected at base with soil or waste stack.—**1.**

If connected into main soil pipe, the latter must be made one size larger before passing through roof. No provision for connection at base.—**2.**

Pipes to be increased 1 in. in diameter before passing through roof. To be connected at base with soil or waste pipe stack.—**3.**

To extend not less than 10 in. and not more than 2 ft. above roof, and to be increased one size for all sizes under 4 in.; or they may be branched into soil pipe above inlet for highest fixture. No provision for connection at base.—**4.**

To extend at least 8 in. above roof and be enlarged at least 1 in. before passing through roof, with a minimum diameter of 4 in. above roof. To be connected at base with soil or waste stack.—**5.**

To extend at least 2 ft. above roof and not to be less than 4 in. in diameter, except in special cases where downspouts may be used for ventilating. No provision for connection at base.—**6.**

Mains to be carried, full size, to a height of not less than 2 in. above roof. To be connected at base with soil or waste pipe stack.—**7.**

May be connected with soil pipes not less than 3 ft. above fixtures, except in buildings three or more stories high, when they must go separately to and above roof. No provision for connection at base.—**8.**

Not specified.—**9.**

To go to roof or into soil pipe above upper fixture. No provision for connection at base.—**10.**

May go separately through roof, or be connected to soil pipe not less than 2 ft. above highest fixture. Minimum bore above roof 2 in. No provision for connection at base.—**11.**

May be run direct to roof and there be increased one size, or be connected to soil or waste pipe stack above highest fixture. To be connected at base with soil or waste stack.—**12.**

To go out through roof, with minimum diameter of 2 in., or may be connected into main soil pipe above highest fixture. No provision for connection at base.—**13.**

Two or more vents may be connected before passing through roof by increasing the main pipe to the combined areas of the pipes so joined. Vents to be increased one size before passing through roof. No provision for connection at base.—**14.**

To be increased to 4 in. before passing through roof. No provision for connection at base.—**15.**

May be connected with soil pipe 2 ft. above highest fixture; or run out separately through roof, with minimum size of 2 in., and encased above roof in a pipe 2 in. larger than vent. No provision for connection at base.—**16.**

To go at least 2 ft. above roof; or may connect with soil pipe above highest fixture in buildings of not more than four stories. No provision for connection at base.—**17.**

May go above roof, with minimum bore of 2 in.; or be connected with soil pipe above highest fixture. No provision for connection at base.—**18-25-28.**

To extend 1½ ft. through roof, or be connected with main stack above highest fixture. To be connected at base with soil or waste stack.—**19.**

To be extended above roof, with minimum diameter of 4 in.; or may be connected with soil or waste line above highest fixture in buildings having fixtures on not more than six floors. To be connected at base with soil or waste stack.—**20-22-33.**

May go through roof, with minimum diameter of 4 in.; or be connected with main stack, above highest fixture, in buildings having fixtures on not more than four floors. To be connected at base with soil or waste stack.—**22.**

To be extended through roof; or may be connected to main stack above the highest fixture, provided stack is not more than 6 ft. distant and there are not fixtures on more than six floors, and provided the main stack is increased 1 in. in diameter from and above junction, except in cases where the stack is 4 in. or more and vent pipe 2 in. or less in diameter. To be connected at base with soil or waste stack.—**23.**

To go through roof, with minimum diameter of 4 in.; or connect with main stack above highest fixture. To be connected at base with soil or waste stack.—**24.**

Not specified; but drawings in code show vents connected with main stacks above highest fixtures, except where yoke vents are used. Provision for connection at base of soil pipe is shown in drawing 10, but not in drawing 8.—**26.**

May go through roof if enlarged to 2 in. for 1¼ in. or 1½-in. vent, and to 2½ in. for 2 in. vent; or may be connected with stacks above highest fixture. No provision for connection at base with soil or waste stack.—**27.**

To be extended through roof, with minimum bore of 4 in.; or be connected with adjoining stack above highest fixture in buildings having fixtures on not more than six floors. To be connected at base with soil or waste stack.—**29.**

To go, separately or combined, 1 ft. above roof. To be connected at base with soil or waste stack.—**30.**

To go through roof, with minimum diameter of 4 in.; or be connected with main stack above highest fixture. To be connected at base with soil or waste stack.—**31.**

To go through roof, or be connected with main stack above highest fixture. To be connected at base with soil or waste stack.—**32.**

May be connected with main stack, above highest fixture, if stack is not more than 6 ft. distant; otherwise to go separately through roof, with minimum bore of 2 in. To be connected at base with soil or waste stack.—**34.**

Two or more vents may be connected together, or with a soil pipe, above highest fixture. No provision for connection at base with soil or waste stack.—**35.**

system through accumulations of rust or scale from pipes or fittings not properly protected against corrosion.

In the codes under consideration, the materials for trap-vents are specified in 32 instances; partly specified in 1 instance; and not specified in 2 instances.

The choice of materials may be seen from the following summary of the number of times each material is mentioned:

Iron, 4 instances.—Cast-iron, 13 instances (in one instance for pipes not less than 3-in.).—Extra heavy cast-iron, 8 instances.—Heavy cast-iron, coated with tar or asphaltum, 1 instance.—Wrought-iron, 4 instances (in 1 instance for pipes over 2½-in.).—Galvanized wrought-iron, 22 instances (in 1 instance for pipes over 1½-in.).—Enameled iron, 3 instances.—Steel, 4 instances.—Galvanized steel, 3 instances.—Durham system of pipes, 1 instance.—Brass, 18 instances (specified in 1 instance as "heavy").—Copper, 3 instances.—Lead, 28 instances (specified in many instances for short branches only; in 3 instances, for exposed work only; and in 2 instances, to be not lighter than "D" lead pipes).—Loricated porcelain, 3 instances.

In the New Orleans code, it is specified that "Standard" cast-iron pipe may be used for buildings of less than 3 stories in height, and extra heavy cast-iron for buildings of 3 stories and over in height.

By the above summary, it may be seen that, in many instances, the materials for vent-pipes are not properly designated. Thus, "iron" may mean either cast or wrought-iron; "cast-iron" may mean light-weight or extra heavy pipe; "wrought-iron" or "steel" may mean any weight of pipe, any form of weld, plain black pipe, or galvanized pipe; "lead," "brass," or "copper," may mean any class or weight of pipe, from the cheapest or lightest grades up.

Sizes.—In view of the fact that there is no scientific basis for the determination of the proper sizes of trap-vents in general, it is not surprising that, in very many of the codes under consideration, there should be such widely different specifications; and where the provisions of the codes agree in this particular, it is very probable that they were copied, entire or in part, one from the other.

Analyzing the provisions of the codes relative to main vents for water-closets, we find that, in one instance, a 2-in. main may be used for a length of 25 ft.; in others, for lengths of 30, 40 or 50 ft., to be governed in some cases by the number of fixtures. In one instance, a 2½-in. pipe must be used for a main over 25 ft., and in another instance, for each additional 20 ft. over the first 40 ft. In one instance, a 3-in. main is to be used for the first 20 ft.; in others, for all over 25 ft.; in others, for all over 30 ft.; in one, for all over the first 50 ft.; in one, for more than 3 floors; and in one, for more than 4 stories. In one instance, a 4-in. pipe must be used for all over 20 ft. in length; and in another, for all over 30 ft.

Similar variations are found in the specifications for the main and branch vents for fixtures other than water-closets, and also for water-closets in conjunction with other fixtures; and, with the exception of those codes in which the specifications for trap-vents have, evidently, been copied one from the other, the further the analysis is carried out, the more bewildering does it become. One thing is clear, however, that if the present method of furnishing protection against siphonage, by means of trap-vents, is to be continued for any length of time, there should be a complete revolution in the specifications of very many codes relative to the sizes of such vents.

Connection with Trap.—In the passage of greasy water through a trap, which is vented at the crown, grease will be projected into the vent-opening, and a stoppage in the latter may, sooner or later, be expected to occur therefrom. This fact has been given wide publicity by many writers upon the subject of trap ventilation, particularly in recent years, yet the crown-venting of traps, exclusive of the traps of water-closets and slop-sinks, is specified in 18 of the codes under consideration, and prohibited in but 6 of the codes. Eleven codes are either silent or not clear upon this important question.

Termination at Roof.—The methods of termination of trap-vents at or below the roof may have a very important bearing upon the manner in which such vents perform their function, even to the extent of rendering useless what might otherwise be considered a well-arranged and well-proportioned system of trap ventilation. Thus, in the case of roof extensions of small diameter, there would be serious danger of the closing of the vents, by hoar frost, during the greater portion of the winter. Again, where, as is often the case, a vent is not extended through the roof, but is connected with the soil or waste stack at some point below the roof, the free flow of air through the vent may be seriously interfered with at a time when the water-seal of a trap which is connected with the vent is in danger of destruction: (1) By the connection of the vent with the stack at a right angle; (2) By the lack of proper pitch in the pipe connecting the vent with the stack; (3) By a long, horizontal, or nearly horizontal, run from the vent to the stack; (4) By the failure to make proper enlargement of the roof extension of the stack, beginning from a point below the vent connection.

In one of the codes under consideration, no stipulation is made as to the method of termination of trap-vents at the roof; and in very many other codes, the specifications are faulty, or lacking in some one or more important particulars.

Of the 34 codes which contain some one or more specifications relative to the roof termination of trap-vents, 12 codes make provision for a minimum extension above the roof of 4 in.; 2, for a minimum of 2 in.; and 1 for a minimum of 2½ in. Five codes provide for the enlargement of the soil and waste stacks, to which trap-vents may be connected, before passing through the roof. In 8 of the codes, it is specified that vents may not be connected with the stacks below the roofs, but go independently through the roofs, in buildings over a certain height; but in this particular, as in many others in the codes, we find a striking lack of uniformity. Thus, in 2 codes, vents must go independently through the roof in buildings having fixtures on more than 5 floors; in 1 code, in buildings of over 3 stories; in 2 codes, in buildings of over 4 stories; and in 3 codes, in buildings having fixtures on more than 6 floors. In 1 code, the vents must not be connected with stacks more than 6 ft. away.

Termination at Base.—What has just been said relative to the importance of the proper termination of main vent-pipes at their upper ends will apply, with equal force, to the termination of such vents at the base. Where iron, particularly wrought-iron, pipes are used for the vents, it will only be a matter of time when rust or scale will form on the inside, become detached, and fall to the lowest part of the pipes, there to accumulate and effect a stoppage unless an outlet is provided for its escape. This can and should always be done by connecting the lower ends of main vents, at an obtuse angle, with the nearest soil or waste-pipe stacks.

(To be continued.)

Among the Wholesalers

NATIONAL COMMITTEE OF C. S. A. ISSUES STANDARD SPECIFICATIONS ON RANGE-BOILERS AND RULES FOR USE OF "NACO" TRADE-MARK.

The National Committee of the Confederated Supply Associations has just issued a most important document from its headquarters, 261 Broadway, New York City, containing, as it does, the specifications on range-boilers and the rules for applying the trade-mark "Naco," recommended by the Standard Committee of the National Committee, and unanimously adopted by the National Committee of the Confederated Supply Associations at the annual meeting in New York City, November 18, 1909. It is a great source of satisfaction to be able to make this announcement, because "Domestic Engineering" for years has advocated the adoption of uniform standards along this and other lines of plumbing material. This means that an actual and definite step has been taken with respect to formulating standards, and the important work of improving the quality of plumbing material will, without question, be greatly advanced as a result of this progressive action. The specifications and rules referred to follow herewith:

"Specifications on Range-Boilers and Rules for Applying the Trade-Mark 'Naco.'

"1. That the following specifications on range-boilers be adopted upon which the 'Naco' trade-mark can be used under the rules of the National Committee.

"(A) All range-boilers shall be indelibly marked with their actual capacity.

"(B) Standard range-boilers to be marked indelibly and guaranteed maximum hydraulic working pressure 85 lb.

"Extra heavy range-boilers to be marked indelibly and guaranteed maximum hydraulic working pressure 150 lb.

"(C) Range-boilers shall have thickness of shells, heads and bottoms as follows:

"United States Gage.

"Standard Weight Range-Boilers.

Diameter	Shell	Head	Bottom
10 in.	13 Gage	11 Gage	11 Gage
12 in.	13 "	10 "	10 "
13 in.	13 "	10 "	10 "
14 in.	13 "	10 "	10 "
16 in.	12 "	10 "	10 "
18 in.	12 "	10 "	7 "
20 in.	11 "	10 "	3/16 "
22 in.	11 "	10 "	3/16 "
24 in.	11 "	10 "	3/16 "

"Extra Heavy Weight Range-Boilers.

Diameter	Shell	Head	Bottom
10 in.	11 Gage	11 Gage	11 Gage
12 in.	11 "	10 "	10 "
13 in.	11 "	10 "	10 "
14 in.	11 "	10 "	10 "
16 in.	11 "	10 "	10 "
18 in.	10 "	10 "	1/4 "
20 in.	10 "	3/16 "	1/4 "
22 in.	10 "	3/16 "	3/16 "
24 in.	10 "	1/4 "	1/4 "

"2. That the 'Naco' plan be put into effect on range-boilers July 1, 1910.

"3. That the president and secretary of the National Committee be instructed to design and adopt and have copyrighted a distinctive design of label bearing the trade-mark 'Naco,' and that the label shall have in addition to the word 'Naco' the name of the article on which it is to be used.

"4. That the sanitary engineers and plumbing inspectors be furnished with copies of these specifications, with the request that they use their influence to secure the passage of state laws and city ordinances requiring that goods used in their states and cities conform thereto.

"National Committee
"of the Confederated Supply Associations.
"Frank S. Hanley, Secretary."

MONUMENT PLUMBING SUPPLY COMPANY INCORPORATED.

The Monument Plumbing Supply Co., St. Louis, Mo., has been incorporated with a capital of $62,000 by William Ivy, M. I. Ivy and M. F. Ivy.

WOLVERINE BRASS PLANS NEW ADDITION.

The Wolverine Brass Works, Grand Rapids, Mich., have purchased a lot, 200 ft. wide, on Canal St., in that city, on which the concern is planning to build an addition to its plant.

ALLYNE BRASS TO MOVE INTO NEW PLANT.

The Allyne Brass Foundry Co., Detroit, Mich., expects to move into its new quarters in about sixty days, at which time its output in its present line will be doubled and new specialties added.

TO SELL GIBLIN BOILERS IN THE NORTHWEST.

The Reid Supply Co., 240-246 Sixth Ave., S., Minneapolis, Minn., has been appointed sales agents for Giblin & Co., Utica, N. Y., handling this company's line of steam and hot-water boilers and warm-air furnaces in Minnesota, North and South Dakota and Montana.

WILL MAKE PLUMBING SPECIALTIES.

The Watson-Penfield Corporation, Hartford, Conn., has been incorporated with a capital of $20,000 to manufacture plumbing specialties. The incorporators are Henry J. Watson, R. W. Penfield, both of Hartford; and Nicholas K. Beck, of New Bedford. The officers of the new company are Henry J. Watson, president and treasurer; R. W. Penfield, secretary.

MAKE NOTABLE ADDITIONS TO ITS SALES-FORCE.

The Burlington Brass Works, Burlington, Wis., which recently completed extensive additions to its large plant, is increasing its selling force to a notable degree. Geo. P. Stannard, a veteran brass man, is to cover the central and western states, with an office in Chicago, and R. A. Cole, Haydenville, Mass., will cover New England and New York state, west of Buffalo, while J. W. Gannon will take care of the company's interest in New York City and vicinity and make his headquarters in that city.

THE JANUARY MEETING OF THE ILLINOIS CHAPTER.

The Illinois Chapter of the American Society of Heating and Ventilating Engineers held its regular monthly meeting in the hall of Chicago Architectural Club, Chicago, on Tuesday evening, January 11th. The meeting was well attended and the speakers of the evening were Dr. W. A. Evans, of the Health Department, Chicago; Dr. G. H. Hurty, State Commissioner for the Board of Health, Indianapolis; Dr. William Winslow, of the Massachusetts Institute of Technology, Boston; Chas. B. Ball, Chief Sanitary Inspector, and Dr. Tonney, both of the Chicago Health Department.

Dr. Evans was the first speaker. He called attention to the lack of co-operation between the sanitary experts and the ventilating engineers, stating that this lack of co-operation was probably responsible for the lack of development of the ventilating science, the engineer, of course, doing his work in order to accomplish certain results deemed advisable by the sanitary experts and that in his estimation the ventilating methods in use at the present date needed revision to be adapted to the modern understanding of the effects of impure air. The doctor felt that our present system of ventilation should be remodeled to conform to these new conditions and that in order to accomplish this that a conference or commission consisting of from three to six sanitary experts and a like number of ventilating engineers should be appointed and that this commission would meet

and the sanitary portion would outline what they would like to have accomplished and the engineers would outline how this result could be accomplished and through this commission it was hoped that beneficial results would be derived.

Dr. Evans was followed by Dr. Hurty, who outlined what had been accomplished in Indiana and what had been attempted. The State Board of Health of Indiana is accomplishing far more than is attempted in Illinois and is a great deal ahead of the western states. Dr. Hurty felt that the present methods were about the best that could be used considering the practicability of the installations. He earnestly solicited the co-operation of the American Society of Heating and Ventilating Engineers and urged the appointment of a commission as suggested by Dr. Evans. He called attention to the splendid results obtained from the modern fresh-air schools and the effect of the pure air thus obtained upon backward and weakly pupils. He volunteered any assistance that the state of Indiana could give and along the lines of compulsory ventilation gave a number of interesting and instructive suggestions.

Dr. Hurty was followed by Dr. Winslow, who brought up a number of interesting points, supporting Dr. Evans in his original suggestion of a joint commission.

A discussion followed, resulting in the Illinois Chapter's action toward apointing its quota of representatives and Dr. Evans promising the co-operation of his department toward having this commission given official standing. It is hoped that the discussion started will result in the betterment of our ventilation methods and application.

This matter will be brought up at the annual meeting of the American Society of Heating and Ventilating Engineers in New York City and will again be discussed and further action taken at the next regular meeting of the Illinois Chapter, to be held the second Monday in February.

JOBBERS OF WROUGHT PIPE TO MEET AT PITTSBURGH.

The National Association of Jobbers of Wrought Pipe and Fittings will hold its annual convention at the Fort Pitt hotel, Pittsburg, Pa., March 14, 15 and 16, 1910, according to the official notice just issued by the secretary of the association, Thos. A. Fernley, 505 Commerce St., Philadelphia, Pa.

CINCINNATI PLUMBERS ELECT OFFICERS.

The Master Plumbers' Association of Cincinnati, O., held its annual meeting on Thursday evening, January 13th, at the Odd Fellows Temple building in that city and elected the following officers for the ensuing year: President, Jerome A. Murphy; vice-president, Richard T. Cluxton; secretary, Louis T. Robisse; treasurer, J. B. Laumann; sergeant-at-arms, Commodore Chas. F. Weber. Board of Directors: John Henry Brinck, Louis Krouse, Geo. Kiesewetter, John J. Vogelpohl, Wm. Wagner, Chas. Wanner, Edward J. Frank, Frank Niesen, Wm. Attlessy. Delegates to state convention at Youngstown: John J. Vogelpohl, Ray J. Hillenbrand, Edw. B. Kleine, Edw. J. Frank, Bernard J. Laumann, Chas. F. Weber, R. T. Cluxton, Edw. H. Moragn, Jerome A. Murphy. The retiring president, John J. Vogelpohl, was presented by the association with an elegant silver dinner set. After the meeting the members retired to Renners cafe, where an elegant banquet was served, and it was in the wee small hours of the morning when the members finished telling of the good work of the old officers of the association and the prosperous year the association and members had. Senator Clifford T. Schlemmer, one of the members, made an able address which was received with much enthusiasm.

William McCully, who was engaged in the plumbing business for a period of nearly half a century at Sixth and Federal Sts., Philadelphia, passed away at his home in that city on Wednesday evening,, January 5th, in his 76th year. He retired from active business in 1902, until which time he was a member of the plumbing firm of McCully & Iseminger. He is survived by three sons and two daughters.

The Metal Market

NEW YORK METAL MARKET.

Dealers' buying prices are as follows:

Heavy crucibled copper	$12.37½	to $12.62½
Light copper	10.87½	11.12½
Plumbers' cocks and faucets	9.75	10.00
Heavy lead	4.25	4.40
Tea lead	4.05	4.15
Solder joints	7.50	8.00
Block tin pipe	31.00	32.00

CHICAGO IRON MARKET, JANUARY 19.

Lake Superior Charcoal	$19.50-$20.00
Southern, No. 2 Foundry	18.35- 18.85
Northern, No. 2 Foundry	19.00- 19.50

January 18, 1910.

Foundry iron was the same as the week previous.
$1 more a ton than year previous.
Copper was ¼ cent more a lb. than month previous.
¾ cent less than the year previous.

CHICAGO OLD METAL MARKET.

Dealers' buying prices are as follows:

Clean heavy copper and wire	$12.75
Light copper	11.12½
Heavy yellow brass	9.00
Light brass	7.00
Heavy lead	4.25
Tea lead	3.70
Mixed pewter	24.00

THE PIG IRON MARKET.

The cast iron pipe interests, including the makers of soil pipe, have been heavy buyers of foundry irons in the Eastern markets. The largest maker, of pipe, is understood to be in the market for about 50,000 tons. Prices are but little changed. The situation in southern irons seems to be one of much strength for last half deliveries, but a tendency to get business for prompt shipment. Very little iron is offered for first quarter and none of it is pressing on the market. Sales have been made for nearby Southern No. 2. Birmingham, at $13.75. For delivery during the second half, however, blast furnace interests are firm in their ideas and ask $14.50 there or $18.75 to $19.75 New York.

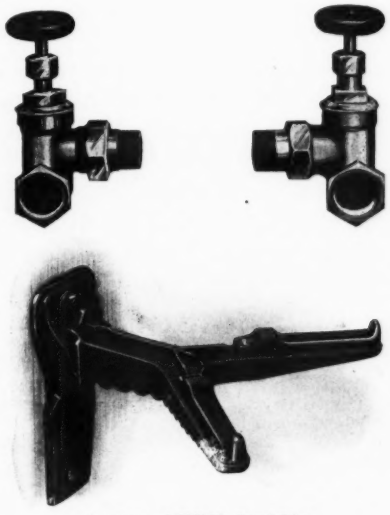
Several contracts for malleable have been made recently, and in New York it is selling at $19.50 to $20. A Buffalo maker has recently advanced its quotation for silicon irons to $17 to $18, according to contents. These are for first half—second half being held 50c a ton higher although no business is being booked. An increasing inquiry is noted for forward delivery, but the contracts actually made have only been for small tonnages. For delivery during the first quarter, the following figures are named for Northern irons: No. 1, $19.25 to $19.75; No. 2X, $19 to $19.25; No. 2 plain, $18.50 to $19.

THE COPPER MARKET.

The market in copper is higher, but with only a small amount of business being transacted. Electrolytic is held at 14c net cash f. o. b. New York for large lots and 14½ to 14¾c. for small quantities from store. Lake commands 14¼c. for large lots. The producer of the leading Lake brand is very firm in its ideas regarding price. In the brass trade there is an unusual amount of activity, all the New England mills are running full time and, in some quarters, a scarcity of finished material is noted. The sheet copper makers, too, are being urged to make more prompt deliveries. One important roller, whose mill burned last summer, has had no end of trouble in getting its work done by other makers. Sheet copper, used for lining cistern tanks, a brass mill product, is in active demand. The price of sheets is unchanged at 18c. base. It is evident, to those who have studied the situation, that with the demand for wire as limited as it is, as soon as this branch of the business picks up there will be a very good inquiry for all kinds of copper.

Minor Sales

"Each little helps" might be used as a daily reminder to keep pushing the sales of IDEAL Specialties. A steady average of daily sales on "small items" such as the IDEAL Regitherm, Norwall Air and Vacuum Valves, Radiator enamels, etc., make an astonishing yearly total.



A group of IDEAL Specialties.

There is not alone the immediate profit in IDEAL Specialties to be considered. They give that final touch to the job which means complete satisfaction, and increases the house-owners respect for the steamfitter. IDEAL Specialties maintain the same high standard of merit as IDEAL Boilers and AMERICAN Radiators.

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Washington					

PACIFIC COAST LETTER

There is a great deal of activity being manifested in association circles in San Francisco at the present time and the next six months will be a decidedly lively period in the history of the master plumbers' local. On February 1st the new ruling that no member of the association will accept a plumbing contract from a general contractor will go into effect and it is anticipated that there will be many difficulties thrown in the way of a successful carrying out of this plan by opposing interests, mainly the general contractors. There is no doubt but that the sub-letting of contracts has been the source of considerable profit to contractors and they are not likely to consent to this source of revenue being cut off entirely without a fight. However, the plumbers are very earnest in their declarations that all business hereafter must come from first hands only and they are doing all they can to call the attention of builders generally to the new conditions that will shortly go into effect. Notices have been sent to all of the architects in the city and to the leading contractors and the new ruling will be well understood when the time comes for placing it into effect. At the present time plumbers are taking contracts as they have in the past, but a number of prominent plumbing contractors have refused to accept work from general contractors of late and will start the month of February with all old work cleaned up. There has been some inquiry on the part of builders and intending builders as to whether the new plan would not mean that higher prices would be charged for work in the future, but master plumbers assert that the very reverse will be true. They claim that in the past when taking contracts from general contractors they have found the item of loss so great that they have been compelled to add considerably to their bids as insurance, in most cases this item being 10 per cent. It is claimed that in dealing directly with owners this amount can be saved to builders. Plumbers are now cultivating the acquaintance of architects and desire to co-operate with them for their mutual interests, as the recommendations of the members of this trade will be more valuable than ever in the new regime.

Another question that is receiving much attention from the San Francisco Master Plumbers' Association at the present time is the apprenticeship question, and for the first time since the fire there really seems to be grounds for hope that a settlement of this vexing proposition may be effected. The local journeymen have come to the conclusion that this matter should be settled as soon as possible and are willing to meet the master plumbers on open ground for a settlement of the question that will be satisfactory to all parties concerned. A joint meeting of representatives of the two associations will be held shortly to discuss this proposition and it is anticipated that it will be but a short time until some definite plan will be decided upon. That there is a need of regulation in the matter of apprentices is agreed by both sides, but the matter of apportioning the helpers to the journeymen and other details will call for considerable discussion.

With the opening of the new Lurline Baths in San Francisco that city now has one of the finest public baths in the entire country and one with many innovations that will doubtless prove to be very popular. One of the most important features of the new baths is the filtration plant. All of the water used in the baths is filtered and this system was installed at a cost of more than $10,000. Water from the mains will pass through the filter, then to the heater and on to the deep end of the plunge. It will be drawn off at the shallow end and returned to the filter, sufficient water being taken from the mains to keep the water to the proper level all the time. Salt water is brought from the beach just below the Cliff House in the pipes of the Olympic Salt Water Company, which had a line from there at the time of the fire. The new building of the baths is an exceedingly attractive one of fireproof construction, being of Pompeian design.

J. G. Sorgen, president of the Royal Heating Co., 412-414 Fourth St., San Francisco, has called our attention to the fact that his company is still making a specialty of steam-heating and has no intention of giving up this line of its business. The Royal Heating Co. has been in business for a long time installing hot-water, steam, hot-air and combination systems, and it is comfortably busy in all its departments at the present time. We are glad to make this correction, inasmuch as we recently published an item that would seem to indicate that this company was planning to retire from the steam-heating field.

Plans have been prepared by Reed Bros., San Francisco, for the erection of a 15-story business block on the northeast corner of Fifth and Alder Streets, Portland, Oregon, for John B. Yeon. It is estimated that the building will cost about $575,000. Sealed bids for the different kinds of work on this building will be asked for in the near future.

NEWARK PLUMBERS FIX DATE FOR ANNUAL BANQUET.

The Master Plumbers' Association of Newark, N. J., has selected Thursday, Feb. 3, 1910, for its 15th annual banquet and ladies' night. The event will take place at Achtel-Stetter's, 844 Broad St., Newark. The entertainment committee has been instructed to eclipse all former efforts. Tickets are $3.50 pro persona.

WASHINGTON PLUMBERS HOLD ANNUAL MEETING.

The Master Plumbers' Association of Washington, D. C., held its annual meeting last week and elected the following officers for the ensuing year: President, Samuel Artz; first vice-president, H. T. Suit; second vice-president, Frederick Quinter; secretary, Frederick C. Stelzer (208-210 Seventh St., S. W.); treasurer, E. J. Hannan; sergeant-at-arms, William Conradis.

NEW OFFICERS OF NEW ORLEANS MASTER PLUMBERS' ASSOCIATION ELECTED.

The Master Plumbers' Association of New Orleans, La., held its annual meeting in that city on Monday evening, January 10th, and elected the following officers for the ensuing year: R. V. Lambert, president; H. S. Charlton, vice-president; J. E. Flynn, treasurer; Julius Loeffler, secretary. Executive committee: James H. Aitken, J. S. Gaiennie, E. M. Babst, W. E. Thomas and J. F. Mueller. Secretary Julius Loeffler's address is 633 Bourbon St., New Orleans, La.

WASHINGTON PLUMBERS' ANNUAL BANQUET.

The annual banquet of the Master Plumbers' Association of the District of Columbia will be held on Thursday evening, January 27th, and if the preliminary arrangements which have been made up to this time are an indication of what is to follow, this year's affair will certainly excel any of those previously given. The entertainment committee is hard at work to provide the members and guests on that evening with a program which will drive away the business worries and create that good feeling which always exists when everything goes well. It is hardly necessary to say much more about how good the affair tends to be except to name the chairman and other members of the Entertainment Committee, which will speak for itself: Walter D. Nolan, chairman; William Conradis, Samuel Artz, Harry T. Suit, Frederick C. Stelzer, M. J. McCarthy, Ed. J. Hannan, D. J. Murphy, William Koch and Frederick W. Quinter.

UNUSUAL PLUMBING SPECIFICATIONS.

C. C. Hartwell Co., Ltd., the old and well established plumbing concern of New Orleans, La., has made a new record in devising up-to-date "plumbing specifications" as the following document will show, and we have the word of several journeymen in the concern's service for it that it is most pleasant and enjoyable "to work" in accordance with these specifications. It seems that "the job" was night work, but in spite of this fact it is asserted that not a single man on the job found it tedious or objectionable. The specifications were as follows:

"Specifications of Repairs and Additions to the Innerman in the Building known as the New Hotel Denechaud (Restaurant Francais). By C. C. Hartwell Co., Ltd., Established 1860—50 Years of Reliability."

"Specifications of material to be furnished for the entire satisfaction of the appetite at New Hotel Denechaud, Thursday evening, Dec. 23, 1909, 6 p. m. All to be devoured in strict accordance with all dietary and sanitary laws and under the direct supervision of C. C. Hartwell Co., Ltd.

"General Terms.—The term contractor shall mean the C. C. Hartwell Co., Ltd., and the term sub-contractor shall mean you and the other fellows. A copy of these specifications shall be furnished each sub-contractor, same to remain his property on completion of his work.

"Material.—The contractor will see that all material used is the best of their respective kinds, and satisfactory to the sub-contractor, who will see that same reaches its proper destination.

"Descriptions.—Written descriptions are to be taken in all cases; but the contractor shall not be held liable if the 'fixtures' served look different from the names on the fixture list, nor shall any one take offense at same. Each sub-contractor is to give his personal attention to the work, and in no case will he be permitted to transfer his contract to another. Helpers will not be permitted to do any work for mechanics.

"Inspection.—The contractor is to inspect all material and thoroughly acquaint himself with same. He shall keep pace with the sub-contractors.

"Fixtures.—The following fixtures will be subject to digestion all taken from the catalogue of M. Francois Sartre, articles of other manufacturers will not be accepted:

THIS SYSTEM HAS BEEN ADOPTED TO INSURE OUR PATRONS HONEST AND EFFICIENT WORK.

Job 4 — C. C. HARTWELL CO., LTD. — Date / Customer No.

New Orleans, December 23, 1909

Mr. New Hotel Denechaud Restaurant

No. Baronne and Perdido Street

Repair your appetite

Commence work at 6 o'clock sharp.

Thursday evening, December 23, 1909.

Leander Mix — Plumber — Days — Hours at Job

Helper — for Job at shop

Approved

A Job Ticket Nearly Everybody Likes.

Celery Olives

Soup

Mock Turtle a la Charles Addison

Fish

Tenderloin Trout, White Wine Sauce a la Barlow

Saratoga Chips

Filet Mignon Picquet, Mushroom Sauce a la Deutschland

Green Peas a la Johnanoone (Just as Green)

Roast Turkey a la Piatt

Lettuce Salad a la Therestofus

Dessert

Fruit Cakes

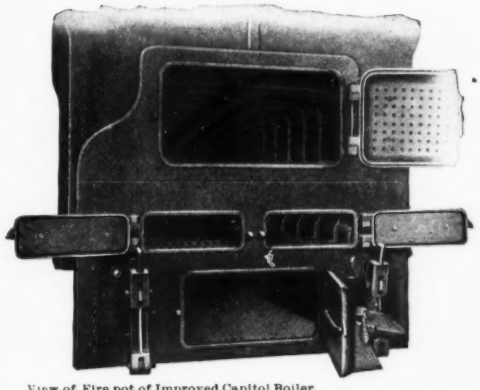
Cafe Noir

Wine a la Happy

"Pipe and Fittings.—Pipes of the corn-cob variety will

CAPITOL BOILERS AND RADIATORS

"We have just installed a second heater of yours, because the first gave entire satisfaction."—Salisbury (Conn.) School, G. E. Snaile, Sec'y.



View of Fire pot of Improved Capitol Boiler. Note the large amount of direct heating surface, the large deep fire pot, the roomy ash pit, and the ease with which the entire boiler can be gotten at.

In a Class By Itself

Do not get the idea that the CAPITOL is an ordinary boiler. It is in a class by itself, because it has distinctive features which were placed there for your benefit and for the benefit of your customer.

Divided sections are easier for you to handle, can be connected easier and give your customer longer efficient service.

The sections are shaped so that each one is an individual boiler delivering steam or hot water into the common topheader to which all the sections are connected.

The topheader which is countersunk flush with the top of the sections insures absolutely dry steam and a steady water line.

Are you interested in learning all the details of this expert construction? We invite your request for circulars.

United States Heater Company.

General Offices and Works: Fort St. and Campbell Ave., DETROIT, MICH.

BRANCHES:		SALES AGENCIES:	
NEW YORK	129 Worth St.	MINNEAPOLIS, MINN.	Plumbing & S. F. Supplies Co.
CHICAGO	34 Dearborn St.	ST. LOUIS, MO.	L. M. Rumsey Mfg. Co.
OMAHA	916 Farnam St.	DENVER, COLO.	Kellogg & Stokes Stove Co.
DETROIT	139 Jefferson Ave.	DULUTH, MINN.	Duluth Plumbing Supplies Co.
KANSAS CITY OFFICE	1020 Commerce Bldg.		

not be permitted in this work, as the contractor will see that cigars are provided. Fittings will not be required. Mr. Helper says they are only good to leave scattered about the job.

"Extras.—All extras will be at the expense of the contractor, but no allowance will be made for double time after 3 a. m.

"Test.—On completion the contractor will see that all sub-contractors have complied with the specifications.

"Completion.—Santa Claus is due tomorrow night and this work must be completed before his arrival.

"Guarantee.—The contractor must guarantee that all have had a good time, that all are happy and none too full."

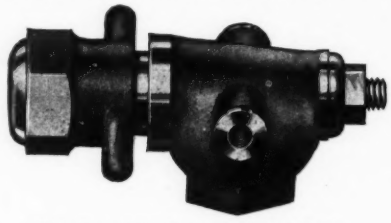
HAS AMPLE FUNDS TO BUILD COMFORT STATION.

The Board of Public Works of Indianapolis, Ind., received bids last week for the building and plumbing of the proposed public comfort station at Illinois St. and Kentucky Ave. in that city. The bids showed that the city can easily construct the station and pay the fees of the architect out of the $20,000 provided for the work. The former Board of Works received bids, but found the money would be $2,500 short after the bills and architects' fees were paid. The sum of the lowest bids this time was $15,658.24. W. F. Stillwell of Lafayette was the lowest bidder for the building, offering to do this work for $11,961.24, and for the plumbing and heating work Hayes Bros. were the lowest bidders, at $3,697. All the bids were referred to Foltz & Parker, the architects. The present Board of Works has expressed itself in favor of proceeding with the comfort station. The other bids for the building were considerably higher than the Stillwell bid, but the plumbing and heating bids ran close together. The building bids were: W. F. Stillwell, Lafayette, $11,961.24; J. T. Eliott, $15,699; W. C. Halstead & Co., $14,800, and the W. P. Jungclaus Company, $14,730. The last three are Indianapolis bidders. The plumbing and heating bids were: Hayes Bros., $3,697; Clarke Bros., $3,863; Michael J. McCarthy, $3,738; J. A. Diggle, $3,781, and Lewis B. Skinner, $3,793.

With the Makers

ROTHCHILD BALANCED FLOAT COCK.

The Rothchild balanced float cock, manufactured by the John Simmons Co., 104-110 Centre St., New York City, is a radical departure from the old principles generally followed in devices of this kind. It is extremely simple, having only four parts and being built entirely of best red metal. This float cock is made with the balanced feature, which accounts for its easy movement under any pressure, regardless of size. This principle eliminates friction and pressure wear, making it practically indestructible. It has been under constant tests for more than three years in many of the finest buildings in New York City, where the high pressure and severest conditions have been perfectly met without leakage, repairs, or complaint of any kind. It is made in regular sizes from ⅜ inch to 3 inches. Any special size can be furnished, and because of its absolute balance, any size, no matter how large, will work as easy proportionately as the smaller sizes, according to the makers' claims.



The Rotschild Balanced Float Cock.

THE CORCORAN LEAD PIPE COUPLING.

The Allyne Brass Foundry Co., Detroit, has just placed upon the market a lead pipe coupling for water-pipes and mains which is attracting much attention. It is named the "Corcoran" and the manufacturers are very enthusiastic in their description of its features, being of the opinion that it will do away with the plumber's wipe joint, and maintaining that all the wipe-joint can do, can now be done better, more expeditiously and more cheaply by this new coupling. The accompanying illustration gives one a very clear idea of this new invention, showing, as it does, all the integral parts of the coupling and their relative positions in being put together. The overall nut (1) holds the various parts in close union, the outside sleeve with flange (2) grips the lead-pipe firmly; the inside or union walls (3) are arranged in such a way that the lead-pipe makes its own washer, and the second sleeve (4) has threads without and grooves within, thus giving the overall nut a chance to make a secure union of the parts of the sleeve with the lead pipe. A well-written and copiously illustrated booklet containing full particulars about this coupling has just been published and can be obtained from the manufacturers upon application, mentioning "Domestic Engineering."

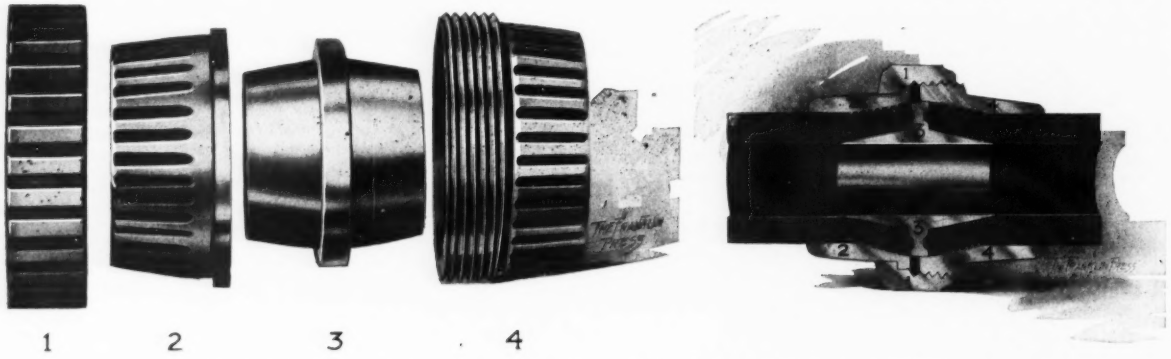
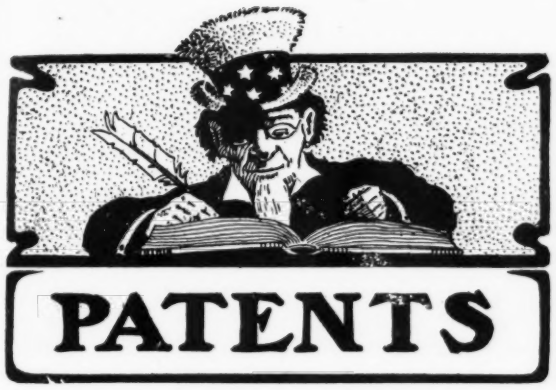


Illustration Shows Parts and Sectional View of the Corcoran Lead Pipe Coupling.

COMFORT STATIONS FOR ST. JOSEPH, MO.

Two public comfort stations and rest rooms are to be maintained by the city of St. Joseph, Mo., if plans of Comptroller Thomas Shaffer are realized. He has selected the basement of the Missouri Valley Trust Company's building, at Fourth and Felix streets, for one, and he proposes to place the other at or near Eighth and Felix streets. Fifth and Edmond streets was avoided because it already is a congested corner and a room there would serve to attract more persons, Shaffer thought. The Missouri Valley Trust Company has offered to rent the rooms for $22 a month, and will remodel and heat the quarters. It desires to give only a five-year lease, however, and the city wants the corner for ten years. The company is expected to accede.



946,025, Flexible Pipe-Joint.—Albert G. Elvin, Franklin, Pa.

946,047, Dust-Removing Apparatus.—Carel Johnson, Berkeley, Cal.

946,106, Water-Gage.—Henry C. Burns, Marshall, Mich.

946,103, Combined Pipe Wrench and Cutter.—Gary G. Brown, Roseburg, Ore. The claim made for this invention is as follows: "A wrench comprising two heads, one of which is provided with a hollow cylindrical handle, said head having a central opening therethrough leading into the interior of said hollow cylindrical handle, a shank to the other head provided with a threaded opening, a screw fitting the threads of said opening and having a ring at its outer end, a threaded shouldered nut upon said screw, means for holding said nut from longitudinal movement upon the screw, the end of said cylindrical handle having an inwardly turned flange adapted to engage the shoulder formed upon said nut, the inner faces of said heads having flanges which are recessed forming jaws, and corresponding ends of the heads being inwardly turned forming vise jaws, as set forth."

946,128, Self-Registering Water-Meter.—Frank W. Hana, Boise, Idaho.

946,130, Flushing Device.—Francis F. Hawkins, Troy, N. Y. Seven claims are made for this invention, the broadest reading as follows: "A flushing device comprising a closed tank of general arc-shaped contour; a shutter within said tank and pivoted at substantially the center of the arc thereof, so as to form a movable partition therein; and alternately operative means, including pipes opening into said tank and alternately closable by said shutter, for admitting water under pressure to said tank through one of said pipes and simultaneously expelling water through the other of said pipes; said shutter being so constructed with relation to said tank as to have a substantially water-tight fit therein when in either of its pipe closing positions and to permit a portion of the admitted water to pass said shutter during a part of its travel; and means for regulating the volume of water so permitted to pass said shutter, substantially for the purposes set forth."

946,139, Water-Feed Regulator.—Willard A. Kitts, Sr., and Willard A. Kitts, Jr., Oswego, N. Y.

946,147. Nozzle-Holder.—Charles F. Mohrhoff, Riverside, Cal.

946,183, Joint-Cover.—Arthur G. Williams, Sidney, N. Y.

946,222, Water-Heater.—Alva E. Higley and Archer S. Higley, Salem, Wis.

946,226, Gas-Fixture.—Abraham Jarmolowsky, New York, N. Y.

946,249, Valve and Faucet.—Fred W. Meyer, Louisville, Ky. Six claims are made for this invention, the most important reading as follows: "In a valve, the combination of a head portion and a cylindric valve-chamber having a conical seat next the head portion, a valve-rod extending through the head portion into said chamber, a valve-carrier in said chamber comprising a hollow cylinder having a reduced head on its end next the seat and connected with the rod, and lateral openings, and exterior channels in rear of the head for the passage of water when the valve is open, and a valve on the reduced head of the valve-carrier adapted to close against the valve-seat."

946,266, Combination Gas and Coal Furnace.—Frederick J. Parker, Cleveland, Ohio.

946,276, Heating System.—Benjamin F. Seymour, Denver, Colo.

946,290, Grease-Cup.—Charles F. Tucker, Hartford, Conn.

946,299, Range-Boiler.—Valentin Wilhelmi, Paterson, N. J. The most important claim made for this invention reads as follows: "In a range-boiler, the combination of a cylindrical shell having an inwardly and upwardly-turned annular flange at its lower edge and an inwardly and upwardly disposed annular shoulder near said flange and a bottom-head having a body-portion, an upwardly extending inner annular flange formed integral with the body-portion and forming a shoulder at the line of meeting therewith and engaging the inner face of the flange of the shell, an outwardly and downwardly-turned outer annular flange forming an integral continuation of the inner annular flange and being bent to form an outwardly and downwardly-disposed shoulder conforming to and engaging the shell and the shoulder thereof and extending into the space between the shell and the flange thereof, whereby is formed between the inner and outer flanges an annular cavity of wedge-shaped cross-section, and a solid filling of solder in said cavity."

946,310, Hot-Water Furnace.—David J. Archer, Toronto, Ontario, Canada.

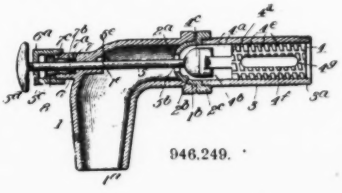
946,316, Grate.—John C. Bartlett, Philadelphia, Pa.

946,333, Steam-Heating Apparatus.—George P. Campbell, Schenectady, N. Y.

946,374, Lubricator.—August J. Krick and Charles E. Thompson, Denver, Colo.

946,384, Expanding Reamer.—John C. Matthews, Oberlin, Ohio.

946,396, Pipe or Hose Coupling.—John H. Phillips, Jr., Jackson, Mich.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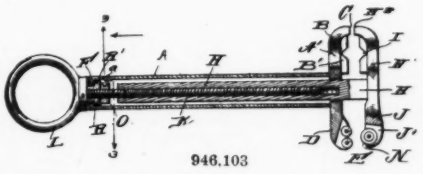
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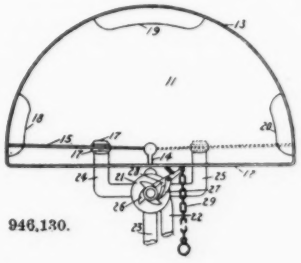
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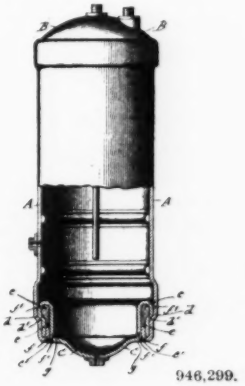

946,299.

Burlington, Iowa.—The Russell Sewage Disposal Company of this city furnished the sewerless sewage disposal system which was installed at P. C. Hart's store and residence in Nichols, Iowa.—Adv.

CLASSIFIED ADVERTISEMENTS

Help Wanted

Salesman Wanted

Boiler salesman with established trade. Address No. 193, "Domestic Engineering," 325 Dearborn St., Chicago.

Wanted—Steam and Hot Water Boiler salesman. Chicago or road territory open. Address No. 202, Domestic Engineering, 325 Dearborn St., Chicago.

Competent salesman thoroughly posted on heating and power supplies to canvass the factory and mill trade in a large city. Address with full particulars, etc., No. 200, "Domestic Engineering," 323-325 Dearborn St., Chicago.

Familiar with general line of plumbing and heating goods, to travel in southern Michigan, northern Indiana and northwestern Ohio. State fully experience, amount of annual sales and salary expected. Address No. 199, "Domestic Engineering," 323-325 Dearborn St., Chicago.

Two experienced traveling salesmen who have some knowledge of plumbing and heating; persons acquainted with the trade. We manufacture an exclusive specialty line; no competition. State experience, references and salary desired. Address No. 196, "Domestic Engineering," 325 Dearborn St., Chicago.

Wanted.

Wanted—First-class representative in the boiler and radiator line for territory adjacent to Chicago. Address No. 201, Domestic Engineering, 325 Dearborn St., Chicago.

Wanted—A man who understands plumbing and heating in all its branches. Good opportunity for the right man; reference required. Address E. W. Webster, DuBois, Pa.

Draftsman acquainted with plumbing fixtures, as assistant. Address or apply to J. H. Gavin, with L. Wolff Mfg. Co., 601 W. Lake St., Chicago.

Reliable man for first class steamfitting contracting business; must be capable and ready to invest $2,500 in the business. An exceptional opportunity for the right man. Address No. 191, "Domestic Engineering," 325 Dearborn St., Chicago.

A western jobber who is about to publish a fixture catalog would like to get in touch with five or six jobbers of plumbing supplies with view of dividing the expense of compiling. Address No. 195, "Domestic Engineering," 325 Dearborn St., Chicago.

Journeymen Wanted.

Sober, ambitious journeymen, competent to earn $4.50 per 8 hour day; steady work for the right men; no applications considered without references; transportation will be refunded to applicants accepted. J. M. Robb, 602 Y. M. C. A. Building, Peoria, Ill.

Situations Wanted

Position Wanted.

Wanted, a position by a practical Heating, Ventilating and Sanitary Engineer; member A. S. H. V. E. & A. S. I. P. S. E. At present employed, but desires a change. Address No. 203, "Domestic Engineering," 325 Dearborn Street, Chicago.

Plumbing Schools.

Learn plumbing on new buildings in four months. Tools furnished. Master Plumbers' Trade School, 3659 Finney Ave., St. Louis, Mo.

Books

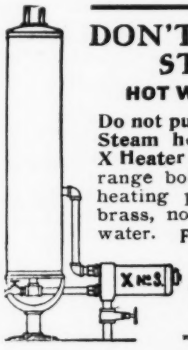
Plumbing Catechism. By Charles B. Ball. Second edition. This book formulates, in question and answer form, the basic principles of plumbing design and practice. It is therefore especially commended to students in engineering and trade schools, and to master and journeymen plumbers, preparing for examinations. Bound in cloth; 6¾x4¾ inches; 100 pp.; postpaid, $1.00. "Domestic Engineering," Chicago.

Tables for Calculating Sizes of Steam Pipes. By Isaac Chaimovitsch. These tables furnish a method of determining sizes of steam pipes for low pressure heating without laborious methematical calculations; bound in cloth; 4½x6⅞ in.; 47 pp.; postpaid, $2.00. "Domestic Engineering," Chicago.

Roughing-in House Drains. Edited by Jno. K. Allen. A complete guide to the work of roughing-in plumbing, from the digging of the sewer to the finishing length of the soil and vent stacks, giving each step to be taken and telling how and why it is done. 6¼x4¼ inches; 134 pp.; bound in boards. Postpaid, 50 cents. "Domestic Engineering," Chicago.

Swimming Pools. By Jno. K. Allen. Their construction; cold and hot water supply; various methods of heating the water; directions as to selecting correct sizes of heaters. A practical guide to the subject. Over thirty illustrations; 6½x4¾ inches. Postpaid, 50 cents. "Domestic Engineering," Chicago.

Dean's Steamfitter's Computation Book. Contains figured cubical contents of rooms of different sizes and ceiling heights; also tables showing radiation necessary at various rates per square foot of glass surface, wall surface, or cubic feet; also square feet of glass or wall in surfaces of various dimensions; also cost of selling price of radiators at various market prices. These tables save fitters thousands of arithmetical calculations, giving the answers ready to hand. Leather bound; 7¾x5 inches; 90 pp.; postage prepaid, $2.50. "Domestic Engineering," Chicago.



DON'T WASTE STEAM

HOT WATER FREE

Do not put a coil in your Steam heater but use an **X Heater** connected to your range boiler and steam heating plant. Made of brass, no rust, no dirt in water. **For prices and circulars write to**

X Specialty Co.
46 Weir Street
Taunton, Mass.

RACK LABELS

PRACTICAL FOR PLUMBERS

Easily applied to shelves, racks or drawers. Shows what you want at a glance; no more guessing or delayed customers. Not only tells the article, but **illustrates it.** Systematizes and facilitates stock taking. It's a money saver! Printed in plain, readable type.

Write for Prices

MERCANTILE LABEL CO.
NASHUA, N. H.

Adjustable Radiator Foot Rest

The time saved on each job pays for them—can be used for bath tubs and other fixtures

The Jennison Company **Fitchburg, Mass.**

Patent Dec. 8, 1908 **Sold by Jobbers**